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A REVISION OF THE GENUS TOWNSENDIA[1]

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History of the Genus

The genus *Townsendia* was first described by William Jackson Hooker in his 'Flora Boreali-Americana' in 1834.[2] It was named in honor of David Townsend of Pennsylvania, an ardent student of botany who contributed substantially to our knowledge of the flora of his native state and especially to the genus *Aster*. Hooker, in establishing the genus *Townsendia*, recognized only one species, *Townsendia sericea*, which he described in detail and carefully illustrated.

Thomas Nuttall,[3] in 1841, added four new species to the genus, namely, *Townsendia incana*, *T. spathulata*, *T. strigosa*, and *T. grandiflora*. The material from which Nuttall described these species was collected by him "on the Black Hills (or eastern chain of the Rocky Mountains) near the banks of the Platte." During the next four decades *T. Parryi* Eaton,[4] *T. condensata* Parry,[5]

[1] An investigation carried out at the Missouri Botanical Garden in the Graduate Laboratory of the Henry Shaw School of Botany of Washington University and submitted as a thesis in partial fulfilment of the requirements for the degree of Master of Science in the Henry Shaw School of Botany of Washington University.

[2] Hook. Fl. Bor. Am. 2: 16. 1834.

[3] Nutt. Trans. Am. Phil. Soc. N. S. 7: 304. 1841.

[4] Eaton, Am. Nat. 8: 212. 1874.

[5] Parry, Am. Nat. 8: 213. 1874.

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T. scapigera Eaton,[6] *T. Rothrockii* Gray,[7] and *T. Wilcoxiana* Wood[8] were described by individual workers, thus making a total of ten known species. In 1880 Dr. Asa Gray[9] published a synopsis of the group to which he added the following species as new: *T. florifer*, *T. Watsoni*, *T. arizonica*, and *T. glabella*. This synopsis formed the basis for Gray's[10] treatment of the group in the 'Synoptical Flora of North America,' in which seventeen species and four varieties of *Townsendia* were recognized. Since 1886 several species have been published and included in the various manuals treating the flora of portions of the western United States; but no revision of the group as a whole has appeared since Dr. Gray's excellent treatment in the 'Synoptical Flora of North America.'

In 1894 Professor Thomas C. Porter revived Richardson's specific name *exscapus* and created the binomial *Townsendia exscapa* (Richards.) Porter,[11] a name which has been current in botanical literature during the last thirty years.

Through the courtesy of Dr. A. W. Hill, Director of the Royal Botanic Gardens, Kew, England, the writer has been privileged to examine portions of the original material on which the genus *Townsendia* was founded. A critical examination of this material shows that the genus was based on two specifically distinct elements, namely, specimens collected by Dr. John Richardson at "Carlton House upon the Saskatchewan," a plant described in 1823 in "Franklin's Journey to the Polar Sea" as *Aster exscapus* Richards.,[12] and specimens collected in the "Rocky Mountains" by Thomas Drummond. These two plants differ in the following important details: Richardson's specimen has pubescent, linear-lanceolate flat leaves, which overtop the heads, and the pappus of the ray-flower equals that of the disk-flower; Drummond's specimen has more densely sericeous-pubescent subterete leaves equalling but rarely exceeding the head, and the

[6] Eaton, Bot. King's Exp. 145. 1871.
[7] Gray, Wheeler Rept. 6: 148. 1878.
[8] Wood, Bull. Torr. Bot. Club 6: 163. 1875.
[9] Gray, Proc. Am. Acad. 16: 82. 1880.
[10] Gray, Syn. Fl. N. Am., ed. 2, 1[2]: 166. 1886 and 1888.
[11] Porter, Mem. Torr. Bot. Club. 5: 321. 1894.
[12] Richards. Frankl. Jour. Bot. App. 7, 748. 1823.

pappus of the ray-flower is much shorter than that of the disk-flower. The specimens collected by Drummond accord in every detail with the description and illustration in Hooker's 'Flora Boreali-Americana,' while those collected by Richardson present several discrepancies when compared with Hooker's description and illustration, particularly in the character of the leaf, pubescence and pappus. Hence the Drummond plant is interpreted as the type of *Townsendia sericea* Hooker, and this species therefore must be taken as the type or standard species of the genus *Townsendia*. The Richardson plant, on the other hand, becomes the type of *Townsendia exscapa* (Richards.) Porter.

General Morphology

Roots.—Most members of the genus *Townsendia* develop rather slender tap-roots. The roots of some of the more caespitose species, however, become very coarse and woody and more or less branched. The slender tap-root with a simple unbranched crown is typical of the genus.

Stems.—The stem presents considerable variation in length and in the extent to which it becomes branched. *Townsendia Parryi* and *T. formosa* have simple, erect, scapiform stems, while *T. grandiflora*, *T. texensis*, and *T. strigosa* have numerous ascending branched stems. The stem is usually herbaceous throughout its entire length, but in some species, particularly those of xerophytic regions, the basal portion becomes distinctly ligneous.

Leaves.—The leaf outline varies from linear-lanceolate to obovate-spathulate. In *T. Watsoni* and *T. Parryi* both types are present, the stem-leaves being linear-lanceolate and the basal leaves obovate-spathulate. The broader leaves are attenuated at the base into a petiole, while the narrower ones are only obscurely petiolate or sessile. The range in the leaf size is from 0.5 to 6 cm. in length and from 0.2 to 1.0 cm. in width. Entire leaf margins prevail throughout the genus. The surface is usually pubescent, but sometimes it is glabrate, as in *T. glabella*. In *T. spathulata*, on the other hand, the leaves are villose-lanate. However, a strigose pubescence of closely appressed hairs as in *T. eximia* and *T. strigosa* is most prevalent in the genus.

Inflorescence.—The heads resemble those of the closely related genus *Aster*. They are usually solitary and terminal and may be borne on naked scapes or peduncles, or in the acaulescent forms sessile among the rosulate leaves. In the branched species the heads are occasionally disposed in clusters of two or three, but the solitary condition is most characteristic.

Involucre.—The involucre is broadly campanulate and is composed of two to six series of imbricated bracts. The outline of the bract within the genus is quite variable, ranging from linear-lanceolate to obovate, and from obtuse to acute or acuminate at the apex. A lacerate-ciliate margin prevails throughout the genus. Furthermore, in most species the involucral bracts also have a membranaceous margin. The character of the terminal portion of the bract is important in the natural grouping of species.

Pappus.—The plurisetose pappus consists of a single row of rather coarse, slightly flattened bristles. The pappus of the ray-flower is somewhat shorter, or often reduced to a crown of short squamellae. The pappus in *T. formosa* in both ray- and disk-flowers is scarcely more than a vestige of the squamellate crown. *Townsendia eximia* develops a coroniform pappus of coalescent rigid squamellae sometimes bearing two or more prolonged awns. The condition in *T. eximia* is analogous to that of *T. glabella* where the short ray-pappus contains a few elongated setae. The character of the pappus in some species is very constant, while in others it is exceedingly variable.

Intermediate stages in the length of the ray-pappus from a crown of short setae to a condition in which the setae equal those of the disk-flower in length may be found in *T. incana* and *T. florifer*. The variability in the length of the pappus in certain species, particularly in *T. sericea*, has been emphasized by Gray, Meehan,[1] and others. It is evident that the length of the ray-pappus alone cannot be used in the differentiation of species.

Plate 5.

Corolla and Stamens.—The corolla of the disk-flower equals the involucre in length while the ray is twice as long. The color of the ray varies within the genus from white through pink to

[1] Meehan, Nat. Flowers II. 1: 189. 1880.

purple but is never yellow. In both ray- and disk-flowers the corolla is deciduous. The stamens are typical of the aster group.

Pistil.—The style appendages are lanceolate and have well-developed stigmatic surfaces in both ray- and disk-flowers. Nuttall referred to the ray-flowers of *T. strigosa* and *T. grandiflora* as "infertile or neuter." A ray-flower from Nuttall's type of *T. strigosa* was found to have stigmatic surfaces exactly like those of the disk-flowers, and the ovary contained a well-developed ovule. Flowers were examined from all recorded species, and in all cases the ray-flowers were found to be fertile. Moreover, in those specimens which had reached maturity the ray-achenes were well developed and appeared to be viable.

Achenes.—The achenes are ovate or oblong, much compressed, and calloused margined, although those of the ray are sometimes triangular. The hairs on the achene are bidentate or glochidiate-tipped. These two types have the same morphological origin, the bidentate forms being merely a forerunner of the glochidiate type. The nature of these hairs is best seen under the low power of the compound microscope. The type of pubescence is fairly constant within the species and is important in the classification of the group.

Geographical Distribution

The genus *Townsendia* is restricted in its distribution to the western half of the North American continent. It extends from western Manitoba and southern Alberta west to the Cascade Mountains in Washington and Oregon, southward to the state of Hidalgo in Mexico. *T. mexicana* is endemic to Mexico. The only other representative of the group occurring in that country is *T. strigosa*, a closely related species which extends from Wyoming and Colorado through New Mexico and Arizona into adjacent Mexico. The genus is best represented in Colorado where ten out of the nineteen species recognized in this paper are found. Material at hand would indicate that three of these are endemic to that state. So far as known, *T. leptotes* occurs only in the Middle and South Park Region, *T. glabella* in southwestern Colorado, while *T. Rothrockii* extends from the north-central part of the state to the Uncompahgre Mountains. Two other species

Plate 1. Geographical distribution of the genus *Townsendia*.

Townsendia exscapa.
Townsendia Rothrockii.
Townsendia eximia.
Townsendia montana.
Townsendia sericea.
Townsendia strigosa.
Townsendia mexicana.
Townsendia scapigera.
Townsendia spathulata.
Townsendia florifer
Townsendia grandiflora.
Townsendia incana.
Townsendia Parryi.
Townsendia Watsoni.
Townsendia arizonica.
Townsendia texensis.
Townsendia formosa.
Townsendia leptotes.
Townsendia glabella.

which seem to be restricted to rather local areas are *T. formosa* of southwestern New Mexico and adjacent Arizona and *T. texensis* of northwestern Texas. The difference between the mountain species *T. sericea* and the plains species *T. exscapa* is very well brought out by material collected in Colorado. The latter has by far the largest distribution of any member of the genus. It extends from western Manitoba and eastern Alberta south through the plains region into Texas, New Mexico, Arizona, and southwestern Colorado. *T. sericea* is found in the Rocky Mountains from Alberta to Colorado and in the Black Hills of South Dakota. Another species which has discontinuous distribution is *T. scapigera* which extends from the Uintah Mountains of Utah to northeastern California and is also found in the region of Santa Fe, New Mexico.

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Abbreviations

The specimens cited in this paper are deposited in various herbaria which are indicated by the following abbreviations:

C = National Herbarium of the Victoria Memorial Museum, Ottawa, Canada; F = Herbarium of the Field Museum of Natural History; G = Gray Herbarium of Harvard University; Kew = Royal Botanic Gardens, Kew, England; M = Missouri Botanical Garden Herbarium; NY = New York Botanical Garden Herbarium; Pomona = Herbarium of Pomona College;

Phil = Herbarium of the Academy of Natural Sciences of Philadelphia; R = Rocky Mountain Herbarium; US = United States National Herbarium.

Taxonomy

Townsendia Hook. Fl. Bor. Am. **2**: 16. 1834; DC. Prodr. **7**: 273. 1838; Nutt. Trans. Am. Phil. Soc. N. S. **7**: 304. 1841; Torr. & Gray, Fl. N. Am. **2**: 185. 1842; Benth. & Hook. Gen. Pl. **2**: 268. 1873; Gray, Proc. Am. Acad. **16**: 82. 1880; Syn. Fl. N. Am. 1^2: 166. 1884, and ed. 2, 166. 1886 and 1888; Coulter, Man. Rocky Mt. Region, 156. 1885; Engl. & Prantl, Nat. Pflanzenfam. 4^5: 161. 1890; Nelson in Coulter & Nelson, Man. Cent. Rocky Mts. 507. 1909; Wooton & Standley, Contr. U. S. Nat. Herb. **19**: 691. 1915; Rydb. Fl. Rocky Mts. 873. 1917, and ed. 2, 873. 1922; Tidestrom, Contr. U. S. Nat. Herb. **25**: 553. 1925.

Herbaceous, caulescent or acaulescent, glabrate or pubescent perennials. Leaves alternate, sessile or petioled, linear-lanceolate to obovate-spathulate, entire. Involucre of many imbricated, appressed, lanceolate bracts, usually with lacerate-ciliate membranaceous margins. Heads many-flowered. Ray-flowers numerous, in a single series, pistillate, fertile, rays linear, 2–5-dentate. Disk-flowers tubular, 5-lobed, perfect. Branches of the style lanceolate, acutish, hairy toward the tip. Pappus uniseriate, that of the disk-flower composed of numerous, rather rigid, barbellate-scabrous bristles as long as the corolla; that of the ray-flowers similar or shorter, sometimes squamellate, with a few longer setae intermixed. Achenes of the disk compressed, obovate to oblong; those of the ray sometimes triangular, pubescent with bidentate or glochidiate-tipped hairs, sometimes glabrate.

Type species: *T. sericea* Hook. Fl. Bor. Am. **2**: 16, *pl. 119.* 1834, which was based on the collection of Drummond made in the "Rocky Mountains."

Key to the Species

A. Bracts of the involucre attenuate-acuminate.
  B. Stems erect, simple.
    C. Pappus plurisetose ..... *1. T. Parryi*
    CC. Pappus a crown of minute squammelate setae ..... *2. T. formosa*
  BB. Stems ascending, branched.
    D. Pappus of ray-flower coroniform-concreted; that of disk-flower similar but with two stout awns ..... *3. T. eximia*
    DD. Pappus in ray-flower a crown of short distinct squamellae; that of disk-flower plurisetose ..... *4. T. grandiflora*
AA. Bracts of the involucre acute or obtuse.
  E. Leaves glabrous or glabrate.
    F. Involucral bracts scarious-margined.
      G. Pappus of ray-flower a crown of short squamellae ..... *5. T. texensis*
      GG. Pappus of ray-flower plurisetose ..... *6. T. glabella*
    FF. Involucral bracts not scarious-margined ..... *7. T. Rothrockii*
  EE. Leaves persistently pubescent.
    H. Achenes glabrous or glabrate ..... *8. T. montana*
    HH. Achenes persistently pubescent.
      J. Hairs on achenes bidentate.
        K. Plants cinereous with short hirsute pubescence.
          L. Involucral bracts linear-lanceolate.
            M. Leaves all obovate-spathulate ..... *9. T. Watsoni*
            MM. Leaves of stem mostly linear-spathulate ..... *10. T. florifer*
          LL. Involucral bracts broadly lanceolate ..... *11. T. scapigera*
        KK. Plants densely subsericeous, villous ..... *12. T. spathulata*
      JJ. Hairs on achenes glochidiate-tipped.
        N. Plants with branched ascending stems.
          O. Involucral bracts in two series, equal ..... *13. T. mexicana*
          OO. Involucral bracts in several series, unequal ..... *14. T. strigosa*
        NN. Plants depressed, caespitose.
          P. Densely canescent, pubescent.
            Q. Leaves 1.5–3 cm. long, narrowly spathulate to oblanceolate ..... *15. T. incana*
            QQ. Leaves 1–1.5 cm. long, obovate-spathulate ..... *16. T. arizonica*
          PP. Sparsely hirsute pubescent ..... *17. T. leptotes*
        NNN. Plants strictly acaulescent.
          R. Leaves narrowly oblanceolate, somewhat glabrate, distinctly flattened ..... *18. T. exscapa*
          RR. Leaves linear-lanceolate, densely pubescent, subterete ..... *19. T. sericea*

1. T. Parryi Eaton, Am. Nat. 8: 212. 1874; Gray, Proc. Am. Acad. 16: 82. 1880; Syn. Fl. N. Am. 1²: 167. 1884, and ed. 2, 167. 1886 and 1888; Coulter, Man. Rocky Mt. Region, 156. 1885; Howell, Fl. Northwest Am. 306. 1897; Nelson in Coulter & Nelson, Man. Cent. Rocky Mts. 508. 1909; Rydb. Fl. Rocky Mts. 874. 1917, and ed. 2, 874. 1922.

Stem erect, naked and pedunculiform above, sparingly leafy below, rarely branched, 5–35 cm. high; leaves rosulate, spathulate, often apiculate, tapering into a petiole, 2–5 cm. long, .3–.5 cm. broad; heads solitary, pedunculate or rarely sessile, 3–6 cm. in diameter including the rays; involucre 3–6-seriate; bracts lanceolate, acute, with narrow scarious margins, lacerately ciliate, inner bracts acuminate; rays twice the length of the involucre, blue; pappus the same in ray- and disk-flowers, persistent, plurisetose, a little longer than the achene; achenes pubescent with bidentate hairs.

Distribution: Rocky Mountains from southwestern Canada to Colorado, west to eastern Oregon.

Specimens examined:

MONTANA: Teton River at the foot of the Rocky Mts., on hard, stony, gravelly plains, May 19, 1854, *Doty 59* (M); bluffs, Midvale, July 4, 1903, *Umbach 254* (F); bluffs, Midvale, June 24, 1903, *Umbach 142* (F); canyon, Helena, July, 1892, *Aiton* (F, No. 90554); Helena, June, 1891, *Kelsey* (F, Nos. 397673 and 397674); Helena, June, 1892, *Starz* (M, No. 713519); mountains about Helena, *Anderson* (M); near Butte, alt. 1846 m., July, 1893, *Mrs. C. H. Moore* (M); rocky canyon, dry ground, Bozeman and vicinity, June 15, 1905, *Blankinship 301* (F); Gallatin Co., May, 1888, *Tweedy 228* (F); mountain meadows, alt. 1537 m., Bozeman, June 1, Livingston, June 8, 1906, *Blankinship 301a* (F, M, R); on a clayey gravelly slope in the foothills ten miles east of Monida, Madison Co., June 18, 1899, *A. & E. Nelson 5425* (M, R); Bridger Mts., June 11, 1897, *Rydberg & Bessey 5132* (F, R); Belt Mts., July 17, 1886, *Anderson* (F, No. 360840); Little Belt Pass, alt. 2154 m., Aug. 10, 1896, *Flodman 828* (M); 1888, *Kelsey* (M, No. 783933); July, 1894, *Mrs. Moore* (M).

YELLOWSTONE NATIONAL PARK: Electric Peak, alt. 2923 m., July 26, 1902, *Smith 16* (F); Mt. Washburn, July 20, 1902, *Smith* (F, No. 121846); Mammoth Hot Springs, June 15, 1902, *Mearns* (F, No. 121848); subalpine, alt. 2923 m., Aug., 1884, *Tweedy* (F, No. 211406); Swan Lake, alt. 2308 m., June, 1885, *Tweedy 695* (F); rocky hills near Mammoth Hot Springs, alt. 1846 m., July, 1893, *Burglehaus* (M); Mt. Washburn, July, 1912, *Eikenberry 59* (F).

WYOMING: Wind River Mts., alt. 2764 m., 1873, *Parry 144* (F, M, *co-type*); Gros Ventres Fork, alt. 2000 m., June 10, 1860, *Hayden* (M); slopes at timber-line, Wyoming Range, 15 miles west of Merna, Sublette Co., July 18, 1922, *E. & L. Payson 2762* (M, R); sage-brush slopes 20 miles west of Big Piney, Sublette Co., July 10, 1922, *E. & L. Payson 2632* (M, R); Gros Ventres Fork, alt. 2400 m., June 5, 1860, *Hayden* (M); in the vicinity of Green River Lakes, Sublette Co., alt. 300 m., Aug. 11, 1925, *E. & L. Payson 4642* (R).

COLORADO: dry ridge near Cottonwood Lake, east of Smoot, Lincoln Co., alt. 3169 m., Aug. 2, 1923, *E. & L. Payson 3693* (M).

IDAHO: dry hillside south of Henry Lake, Fremont Co., alt. 1846 m., July 15, 1920, *E. & L. Payson 2026* (M, R); exposed rocky slopes, base to summit of mountains northeast of Henry Lake, Fremont Co., alt. 2830 m., July 11, 1920, *E. & L. Payson 1979* (M, R).

CANADA: "Moose Mts.," Rocky Mts., alt. 2061 m., June 30, 1897, *Macoun* (F, No. 227891); Mount Forget-me-not, July 16, 1897, *Macoun* (F, No. 227661).

OREGON: subalpine ridges of the Wallowa Mts., alt. 2154 m., July 31, 1899, *Cusick 2295* (F, M, R).

2. T. formosa Greene, Leafl. Bot. Obs. & Crit. **1**: 213. 1906; Wooton & Standley, Contr. U. S. Nat. Herb. **19**: 692. 1915; Nelson in Coulter & Nelson, Man. Cent. Rocky Mts., 508. 1909.

T. pinetorum Greene acc. to Nelson in Coulter & Nelson, Man. Cent. Rocky Mts., 508. 1909, in synonymy.

An herbaceous perennial, spreading by short, stout stolons, the sterile ones ending in a rosette of leaves, the others in a stout upright monocephalous stem about 25 cm. in height; stem striate, sparsely pubescent; leaves thin, glabrous except at the callose-ciliate margin, basal leaves obovate-spathulate, 1.5–4 cm. long, .5–1.5 cm. broad, very obtuse, narrowed below into a sessile or subpetiolate base, those of stem oblong-spathulate, sessile, gradually reduced towards the inflorescence; heads large, 4–6 cm. in diameter including the rays; involucre 2–3-seriate; bracts with broad membranaceous margins, minutely lacerate-ciliate, those

of the outer series broadly ovate, those of the inner series linear-lanceolate, distinctly attenuate-acuminate; achenes glabrous.
Plate 2; pl. 5, fig. 19–24.

Distribution: known only from southwestern New Mexico and adjacent Arizona.

Specimens examined:

New Mexico: Mogollon Mountains on or near the west fork of the Gila River, Socorro County, alt. 2615 m., Aug. 8, 1903, *Metcalfe 413* (M, R); around the south end of the Black Range, Sawyer's Peak, Grant Co., alt. 2770 m., Sept. 30, 1904, *Metcalfe 1434* (M, *co-type*); Sacramento Mts., July 28, 1899, *Wooton* (R).

Arizona: White Mountains, Aug. 6–15, 1903, *Griffiths 5340* (M); Bonita Creek, White Mts., July 23, 1912, *Goodding 1235* (R); Thompsons Ranch, Black River, White Mts., July 13, 1910, *Goodding 561* (R).

3. T. eximia Gray, Mem. Am. Acad. (Pl. Fendl.) N.S. **4**: 70. 1849; Walp. Ann. Bot. Syst. **2**: 822. 1851–1852; Syn. Fl. N. Am. **1**^{2}: 167. 1884, and ed. 2, 169. 1886 and 1888; Proc. Am. Acad. **16**: 88. 1880; Coulter, Man. Rocky Mt. Region, 156. 1885; Coulter & Nelson, Man. Cent. Rocky Mts. 508. 1909; Wooton & Standley, Contr. U. S. Nat. Herb. **19**: 692. 1915; Rydb. Fl. Rocky Mts. 874. 1917, and ed. 2, 874. 1922.

T. Vreelandii Rydb. Bull. Torr. Bot. Club **28**: 22. 1901; Rydb. Fl. Rocky Mts. 874. 1917, and ed. 2, 874. 1922.

Herbaceous perennial, caudex sending up a number of simple or branched stems 15–35 cm. high; leaves spathulate or the upper ones lanceolate, 2–5 cm. long, nearly glabrate; heads terminal, solitary; involucre 3–4-seriate, 1–1.5 cm. broad, 2–3 cm. in diameter; bracts ovate-lanceolate and somewhat cuspidate-acuminate with a narrow membranaceous lacerate-ciliate margin; ray-flowers about 35–40, fertile, blue or purple, with a much-reduced persistent pappus of rigid coroniform-concreted squamellae; pappus of the disk-flowers containing two subulate corneous stout awns which are slightly shorter than the achene; achenes pubescent with glochidiate-tipped hairs, at maturity broadly ovate with a cartilaginous margin. Plate 5, fig. 13–18.

Distribution: mountains of southern Colorado and northern New Mexico.

Specimens examined:

COLORADO: side of Veta Mt., alt. 2600 m., July 19, 1900, *Vreeland 639* (NY, TYPE of *T. Vreelandii*).

NEW MEXICO: Gallinas Valley above the Hot Springs, Las Vegas, Sept. 12, 1881, *G. Engelmann* (M); Las Vegas, Sept., 1881, *G. Engelmann* (M); dry hills and hillsides, Sandia Mts., Balsam Park, alt. 2500 m., July to Aug., 1914, *Ellis 56* (M); La Glorieta, 1879, *Brandegee* (F, No. 204786); Glorieta, 1881, *Vasey* (F, No. 211503); sides of high mountains up Santa Fe Creek, June 28, 1847, *Fendler 353* (M, *co-type*); Santa Fe, 1891, *Alcott* (M, Nos. 890716 and 890499); Canyoncito, Santa Fe Co., alt. 2210 m., June 18, 1897, *A. A. & E. G. Heller 3726* (M); Albuquerque, Sandia Mts., Sept. 6, 1884, *Jones 4157* (F, R); Harvey's Upper Ranch in Pecos River National Forest, alt. 2985 m., Aug. 1, 1908, *Standley 4621* (M); below Winsors Ranch. in Pecos River National Forest, alt. 2550 m., July 19, 1908, *Standley 4412* (M); Rito de los Frijoles, Aug., 1910, *Robbins 8189*, (R).

4. T. grandiflora Nutt. Trans. Am. Phil. Soc. N.S. **7**: 306. 1841; Torr. & Gray, Fl. N. Am. **2**: 186. 1842; Gray, Mem. Am. Acad. (Pl. Fendl.) N.S. **4**: 70. 1849; Proc. Am. Acad. **16**: 83. 1880; Syn. Fl. N. Am. 1^2: 167. 1884, and ed. 2, 167. 1886 and 1888; Coulter, Man. Rocky Mt. Region, 156. 1885; Britton, Man. Fl. Northern States and Canada, 944. 1901; Nelson in Coulter & Nelson, Man. Cent. Rocky Mts., 509. 1909; Wooton & Standley, Contr. U. S. Nat. Herb. **19**: 692. 1915; Rydb. Fl. Rocky Mts. 873. 1917, and ed. 2, 873. 1922.

Caulescent, divaricately branched from the base, 5–20 cm. high; leaves linear, sublanceolate, acute, nearly glabrous, 2–5 cm. long, 0.3–1 cm. broad, two or more of the uppermost usually subtending the head; involucre usually 3-seriate; bracts ovate-lanceolate and rigidly cuspidate-acuminate, with narrow membranaceous lacerate-ciliate margins; heads 1.5–5 cm. in diameter including the rays; pappus of ray-flower reduced to a crown of short squamellae, that of the disk-flower plurisetose, longer than the achene; achenes sparsely pubescent with glochidiate-tipped hairs.

Distribution: eastern South Dakota and Nebraska, west to Wyoming and south to New Mexico; common throughout eastern Colorado.

Specimens examined:

SOUTH DAKOTA: Running Water, Aug. 14, probably 1856, *H. Engelmann* (M); Black Hills on upper Pole Creek, Aug. 1, 1856, *H. Engelmann* (M); Badlands, Cheyenne Valley, Washington Co., July 23, 1911, *Visher 2138* (F).

NEBRASKA: Warbonnet Canyon, alt. 1532 m., June, 1890, *T. A. Williams* (M); Pine Ridge, July 21, 1889, *Webber* (M); Eaglenest Butte, 1853–4, *Hayden* (M).

WYOMING: stony slopes, Laramie Co., June 29, 1901, *Nelson 8312* (M, R); open sandy slopes south of Sibylee, Albany Co., July 3, 1900, *A. Nelson 7373* (M, R); Corlett, June 24, 1907, *Johnston 253* (M).

COLORADO: Douglas Co., 1892, *Walker* (F, No. 376084); Castle Rock, 1889, *Walker* (F, No. 376085); Florence, July 31, 1872, *Brandegee 487* (M); Colorado Springs, July 19, 1872, *Redfield 478* (M); Soldier, June 13, 1899, *Marshall 3138* (F); Garden of the Gods, alt. 2000 m., Aug. 14, 1922, *Brumback & Davis 178* (F); Garden of the Gods, near Colorado City, July 18, 1872, *Porter* (F, No. 318424); Eldorado Springs, alt. 1631 m., June 24, 1917, *Clokey 2810* (F, R); in dry soil, Boulder Canyon, alt. 1692 m., *Young* (F, No. 290193); Colorado Territory, 39–40° lat., alpine and subalpine, 1864, *Parry* (M); Rocky Mts., 40–41° lat., *Vasey 304* (M); infrequent, mesa slopes, Boulder, alt. 1690 m., June 23, 1921, *Hanson C 159* (M); mountains, Larimer Co., alt. 2308 m., June 14, 1896, *Crandall* (M); Una, July 10, 1894, *A. Nelson 385* (M); Platteville, Apr. 17, 1908, *Johnston 492* (M); Horsetooth Gulch, 10 miles southwest of Fort Collins, alt. 1385 m., June 30, 1893, *Baker* (M); Golden, Jefferson Co., July 4, 1915, *Johnston 414 b* (M); foothills near Golden, Castle Rock, July 1, 1885, *Patterson 49* (F, M); foothills near Golden, June 20, 1878, *Jones 284* (F); Gold Hill, Aug. 12, 1875, *Patterson* (F, No. 208980); near Golden City, 1870, *Greene* (F, No. 15363); Fremont Co., near Canyon City, 1873, *Greene* (F, No. 15364); 39–40° lat., alpine and subalpine, 1864, *Parry* (M); Rocky Mts., 40° lat., 1862, *Hall* (F); Rocky Mts., *Hall & Harbour* (F, No. 367351); Rocky Mt.

flora, 39–41° lat., 1862, *Hall & Harbour 289* (F, M); eastern Colorado, *Carleton* (F, No. 353119); southern Colorado, *Brandegee* (F, No. 204740); Manitou, Aug. 11, 1884, *Letterman 83* (M).

NEW MEXICO: low prairie between Orate Creek and Rio Colorado, Aug. 21, 1847, *Fendler 533* (M); Moro River Prairie, Aug. 15, 1847, *Fendler 157* (M).

5. T. texensis Larsen, n. sp.[1]

Herbaceous perennial; the caudex giving rise to ascending branched stems 6–30 cm. high, leafy throughout; leaves oblanceolate, 1–5 cm. long, 0.2–0.8 cm. broad, apiculate, narrowed at the base into a petiole, sparsely pubescent with closely appressed hairs, occasionally glabrate; heads usually solitary, terminal, sessile or short-pedunculate, 1.5–3 cm. in diameter including the ray; involucre 4–5-seriate, 1–1.5 cm. in diameter; bracts oblanceolate, acute, pink-tipped, membranaceous-margined and lacerate-ciliate; ray-flowers dark blue or purple with a reduced plurisetose pappus scarcely longer than the breadth of the achene; pappus of disk-flowers plurisetose, somewhat shorter than the corolla; achene pubescent with glochidiate-tipped hairs. Plate 3.

Distribution: northwestern Texas.

Specimens examined:

TEXAS: Randall Co., "rocky bluffs of the Red River," Aug. 13, 1900, *Eggert* (M, Nos. 121021, TYPE, 121022, 121023); Canyon, Aug. 13, 1900, *Eggert* (M, No. 720398); Randall Co., "rocky banks of the Red River," Aug. 12, 1900, *Eggert* (M, Nos. 121028 and 121027); rocky bluffs of Paloduro, May 30, 1902, *Reverchon 3320* (M); abundant on barren slopes, branch of Paloduro Canyon, Sept. 12, 1917, *Young* (M, Nos. 831212 and 831677); dry

[1] Herbaceis perennis; caule ramoso, ramis ascendentibus, 6–30 cm. altis, foliaceis; foliis oblanceolatis, 1–5 cm. longis, 0.2–0.8 cm. latis, apiculatis, integris, basi in petiolam sensim angustatis, utrinque dense strigoso-pilosis, rarius glabratis; capitulis plerumque solitariis, terminalibus, sessilibus vel brevi-pedunculatis, radio incluso 1.5–3 cm. in diametro; involucris campanulatis, 4–5-seriatis, 1–1.5 cm. in diametro; bracteis involucri oblanceolatis, acutis ad apices roseis, marginibus membranaceis lacerato-ciliatisque; floribus femineis ligulatis, ligulis atro-caeruleis vel purpurascentibus, pappi setis multo reductis vix diametro achenii longioribus; floribus disci numerosis, pappi setis multis paululo corollis brevioribus; acheniis glochideo-pubescentibus.—Collected on "rocky bluffs of the Red River," Texas, Aug. 13, 1900, *H. Eggert* (Mo. Bot. Gard. Herb., No. 121021, TYPE).

open ground, calcareous soil, Channing, Hartley Co., June 19, 1918, *E. J. Palmer 14170* (M); calcareous open ground on plains, Canyon, Randall Co., Oct. 13, 1918, *E. J. Palmer 14586* (M); Canyon, Randall Co., June 12, 1917, *E. J. Palmer 12510* (M).

6. T. glabella Gray, Proc. Am. Acad. **16:** 86. 1880; Syn. Fl. N. Am. **1**[2]**:** 169. 1884, and ed. 2, 169. 1886 and 1888; Coulter, Man. Rocky Mt. Region, 158. 1885; Nelson in Coulter & Nelson, Man. Cent. Rocky Mts. 510. 1909; Rydb. Fl. Rocky Mts. 875. 1917, and ed. 2, 875. 1922.

T. Bakeri Greene, Pittonia **4:** 157. 1900.

Subacaulescent; caudex thick, woody, bearing tufted leaves; leaves thick, pilose when young, soon becoming glabrous, linear-spathulate, 2–4 cm. long, 0.2–0.5 cm. broad, gradually narrowed into a slender petiole; heads solitary, on naked peduncles 2–5 cm. long; heads 1.5–2.5 cm. in diameter including the rays; involucre 2–3-seriate; bracts of the involucre oblong, with narrow membranous margins finely lacerate-ciliate; ray-flowers blue or purple, setae irregular, varying in length from 1 to 5 mm.; pappus of disk-flowers regular, as long as the corolla; achenes sparsely pubescent with glochidiate-tipped hairs.

Distribution: known only from southwestern Colorado.

Specimens examined:

Colorado: Pagosa Springs, Aug. 13, 1917, *Payson 1160* (M, R); dry hills, Pagosa Springs, Archuleta Co., alt. 2160 m., June 29, 1921, *Bethel, Willey & Clokey 4340* (F, M, R); hillside near Dix, alt. 2615 m., *Baker, Earle & Tracy 548* (F, M, R); Los Pinos (Bayfield), May 16, 1899, *Baker 727* (F, M, R, type of *T. Bakeri*); mature yellow pine forest, Piedra, June 31, 1924, *Hazel M. Schmoll 1348* (R); open places between pines, Piedra, June 21, 1914, *Hazel M. Schmoll 1212* (R).

7. T. Rothrockii Gray, acc. to Rothrock in Wheeler Rept. **6:** 148, *t. 7.* 1878; Gray, Proc. Am. Acad. **16:** 85. 1880; Syn. Fl. N. Am. **1**[2]**:** 168. 1884, and ed. 2, 168. 1886 and 1888; Coulter, Man. Rocky Mt. Region, 157. 1885; Nelson in Coulter & Nelson, Man. Cent. Rocky Mts. 510. 1909; Rydb. Fl. Rocky Mts. 875. 1917, and ed. 2, 875. 1922.

Acaulescent; leaves broadly spathulate, approximately 2 cm. long, glabrous, rosulate; heads sessile, approximately 2 cm. in diameter including the rays; involucre 3–4-seriate; bracts oblong or narrowly ovate, purplish, thickish-margined, distinctly ciliate; ray-flowers with a much-reduced pappus; pappus of disk-flowers equalling or exceeding the length of the corolla; achenes sparsely pubescent with glochidiate-tipped hairs.

Distribution: alpine districts of Colorado.

Specimens examined:

COLORADO: loamy places of the foothills, Sheep and Engineer (?) Mts., Uncompahgre River, alt. 3000–3500 m., Aug. 2, 1893, *Purpus 532* (F); South Park, alt. 4150 m., July, 1873, *Rothrock 875* (F, TYPE); South Park, Aug., 1873, *Rothrock* (F, No. 304922 in part).

8. T. montana Jones, Zoe **4**: 262. 1893; Rydb. Fl. Rocky Mts. 874. 1917, and ed. 2, 874. 1922; Tidestrom, Contr. U. S. Nat. Herb. **25**: 554. 1925.

T. alpigena Piper, Bull. Torr. Bot. Club **27**: 394. 1900.

T. dejecta Nelson, Bot. Gaz. **27**: 267. 1904; Nelson in Coulter & Nelson, Man. Cent. Rocky Mts. 510. 1909.

Caespitose from a multicipital caudex; leaves obovate-spathulate, 1–5 cm. long, 0.3–0.5 cm. broad, apiculate, narrowed at the base into a petiole, pubescent in the early stages with appressed strigulose hairs, more or less glabrate; heads 1.5–2.5 cm. in diameter including the rays, sessile or solitary on naked scapes, 1–5 cm. in length; involucre about 3-seriate; bracts of outer series lanceolate, those of the inner series obovate, obtuse, pink-tipped, membranaceous, lacerate-margined; pappus of disk-flowers plurisetose, equalling the length of the corolla, pappus of ray-flowers similar but somewhat shorter; achenes glabrous or glabrate; achenes of ray-flowers occasionally hairy toward the base with a few scattered bidentate hairs.

Distribution: western Wyoming to Oregon, southward into Utah.

Specimens examined:

YELLOWSTONE NATIONAL PARK: Mammoth Hot Springs, July 5, 1902, *Mearns* (F, No. 121847).

WYOMING: Piney Mt., 25 miles west of Big Piney, Sublette Co., Summit, July 12, 1922, *E. & L. Payson 2694* (M, R); calcareous slide rock, Teton Pass Mts., east of Victor, alt. 2831 m., July 22, 1920, *E. & L. Payson 2078* (M, R); mountains near Cottonwood Lake, east of Smoot, Lincoln Co., alt. 3200 m., Aug. 2, 1923, *Payson & Armstrong 3706* (M, R); Sheep Mt. (Ferry Peak), Snake River Range, near Alpine, Lincoln Co., July 11, 1923, *Payson & Armstrong 3474* (M, R); in vicinity of Green River Lakes, Sublette Co., alt. 3169 m., Aug. 5, 1925, *E. & L. Payson 4542* (M).

IDAHO: subalpine slopes of loose calcareous soil, base to summit of mountains northeast of lake, Henry Lake, Fremont Co., alt. 2678 m., July 11, 1920, *E. & L. Payson 1986* (M, R); Mt. Chauvet, July 29, 1897, *Rydberg & Bessey 5131* (F, R).

UTAH: canyon above Tropic, alt. 2154 m., May 29, 1894, *Jones* (Pomona, No. 40754); mountains above Silver Lake, July 30, 1880, *Jones* (Pomona, No. 40756); Alta, above the Flagstaff Mine, Aug. 7, 1879, *Jones* (Pomona, No. 40755, TYPE of *T. montana*); loose stony soil, Uintah Mts., Dyer Mine, July 3, 1902, *Goodding 1238* (R, M, *co-type* of *T. dejecta*).

OREGON: subalpine ridges of Wallowa Mts., alt. 2015 m., July 31, 1899, *Cusick 2294* (F, M, *co-types* of *T. alpigena*).

9. T. Watsoni Gray, Proc. Am. Acad. **16**: 84. 1880; Syn. Fl. N. Am. 1^2: 168. 1884, and ed. 2, 168. 1886 and 1888; Nelson in Coulter & Nelson, Man. Cent. Rocky Mts. 509. 1909; Tidestrom, Contr. U. S. Nat. Herb. **25**: 554. 1925.

T. strigosa Eaton, non. Nutt. Bot. King's Exp. 145. 1871; Gray, Syn. Fl. N. Am. 1^2: 168. 1884, and ed. 2, 168. 1886 and 1888.

Caulescent, hirsute with a close appressed pubescence; the caudex sending up a number of branched, sparingly leafy stems; leaves mostly obovate-spathulate, 2–4 cm. long, 0.2–0.8 cm. broad, narrowed into a petiole; heads on short bracteate or naked peduncles, 0.3–1 cm. long, 1–1.5 cm. in diameter including the rays; involucre 2-seriate; bracts oblong-lanceolate, margins membranaceous, lacerate-ciliate; ray-flowers with a reduced pappus of unequal capillary bristles shorter than the diameter of the achene;

pappus of the disk-flower equalling or surpassing the corolla; achenes pubescent with bidentate hairs.

Distribution: southeastern Oregon through Nevada to southwestern Utah.

Specimens examined:

UTAH: Dugway, May 28, 1891, *Jones* (M); Glenwood, alt. 1692 m., May 24, 1875, *Ward 92* (F, M).

NEVADA: 1891, *A. J. Jones* (M).

OREGON: sandy soil near Vale, May, 1896, *Leiberg 2067* (M); common on hills, in the region of Malheur River, June 19, 1898, *Cusick 1935* (F, M).

10. T. florifer (Hook.) Gray, Proc. Am. Acad. **16:** 84. 1880; Syn Fl. N. Am. **1**[2]**:** 167. 1884, and ed. 2, 167. 1886 and 1888; Coulter, Man. Rocky Mt. Region, 157. 1886; Howell, Fl. Northwest Am. 306. 1897; Piper, Contr. U. S. Nat. Herb. **9:** 563. 1906; Rydb. Fl. Rocky Mts. 874. 1917, and ed. 2, 874. 1922; Tidestrom, Contr. U. S. Nat. Herb. **25:** 554. 1925.

T. strigosa Gray in Wilkes' Exp. **17:** 344. 1874, not Nutt., fide Gray, Proc. Am. Acad. **16:** 84. 1880.

T. florifer Gray var. *communis* Jones, Proc. Calif. Acad. II. **5:** 697. 1895.

Erigeron ? florifer Hook. Fl. Bor. Am. **2:** 20. 1834.

Aplopappus florifer Hook. & Arn. Bot. Beechey Voy. 351. 1841, excl. var. β.

Stenotus florifer Torr. & Gray, Fl. N. Am. **2:** 238. 1842, excl. var. β.

Caulescent, cinereous-hirsute; the caudex sending up a number of simple or branched stems 5–18 cm. high, leafy throughout; leaves linear or the lowest lanceolate-spathulate, acute, mostly apiculate-acuminate; heads 2–3 cm. in diameter including the rays, solitary, terminating the branches; involucre 2–3-seriate; bracts linear-lanceolate and acute, of about equal length, the membranaceous margins lacerate-ciliate; ray-flowers with pappus similar to that of the disk-flowers but varying in length from about the width of the achene to nearly as long as that of the disk-flowers; pappus of disk-flower composed of coarse, white setae which exceed the corolla in length; achenes densely pubescent with bidentate hairs. Plate 5, figs. 25–28.

Distribution: dry hills and plains, central Washington and Oregon, southeastward through southern Idaho, Utah, to western Wyoming.

Specimens examined:

Wyoming: moist rich bottoms, Gros Ventres Fork, alt. 2000 m., June 10, 1860, *Hayden* (M).

Idaho: ditch banks along fields, Challis, Custer Co., alt. 1662 m., July 15, 1916, *Macbride & Payson 3225* (M, R); clayey hills, Kings Hill, Elmore Co., alt. 800 m., July 16, 1911, *Nelson & Macbride 1149* (M, R); dry stony hillsides and dry flats, Arco, Blaine Co., alt. 1640 m., July 3, 1916, *Macbride & Payson 3095* (M, R); loose soil, Reynolds Creek, Owyhee Co., alt. 1538 m., July 3, 1911, *Macbride 1017* (M, R); gravelly slopes, New Plymouth, Canyon Co., alt. 680 m., May 21, 1910, *Macbride 90* (M, R); near Nampa, July 1, 1892, *Mulford* (M).

Utah: Joseph City, Sevier Co., alt. 1692 m., May 13, 1899, *Jones 6379* (M); Marysvale, alt. 1846 m., May 31, 1894, *Jones 5323* (M, F); rim of Great Salt Lake Desert, May 6, 1889, *H. Engelmann* (M); sage-brush slopes, Milford, June 5, 1902, *Goodding 1046* (R).

Washington: Ritzville, Adams Co., alt. 480 m., June 6, 1893, *Sandberg & Leiberg 169* (F, M); Craigs Ferry, Kittitas Co., July 15, 1903, *Cotton 1361* (M); Columbia River opposite Umatilla, Apr. 20, 1882, *Howell* (F, No. 206944); Columbia River opposite Umatilla, Apr. 29, 1882, *Howell* (M); Wilson Creek, June, 1893, *Sandberg & Leiberg* (M); Yakima region, Cascade Mts., June, 1882, *Brandegee* (M).

Oregon: near Lexington, Morrow Co., alt. 420 m., May 7, 1894, *Leiberg 34* (F, M); near Umatilla, May 1, 1882, *Howell* (F, No. 396898); on open plains, Cline Falls, Crook Co., May 22, 1905, *Nelson 815* (M, R); dry banks of Deschutes River five miles below Bend, July 30, 1920, *Peck 9708* (M); stony hills west of Silver Creek (and common westward), June 28, 1901, *Cusick 2616* (F, M, R).

11. T. scapigera Eaton, Bot. King's Exp. 145. *t. 17.* 1871; Gray, Proc. Am. Acad. **16**: 84. 1880; Syn. Fl. N. Am. **1**^{2}: 168. 1884, and ed. 2, 168. 1886 and 1888; Rydb. Fl. Rocky Mts. 874.

1917, and ed. 2, 874. 1922; Tidestrom, Contr. U. S. Nat. Herb. **25**: 554. 1925; Jepson, Man. Fl. Plants California, 1044. 1925.

Aplopappus florifer var. β Hook. & Arn. Bot. Beechey Voy. 351. 1841 (fide Gray).

Stenotus florifer var. β Torr. & Gray, Fl. N. Am. **2**: 238. 1842 (fide Gray).

T. scapigera var. *caulescens* Eaton, Bot. King's Exp. 145. 1841; Gray, Proc. Am. Acad. **16**: 84. 1880; Syn. Fl. N. Am. **1**^{2}: 168. 1886, and ed. 2, 168. 1886 and 1888.

T. scapigera var. *ambigua* Gray, Proc. Am. Acad. **16**: 84. 1880; Syn. Fl. N. Am. **1**^{2}: 168. 1884, and ed. 2, 168. 1886 and 1888; Tidestrom, Contr. U. S. Nat. Herb. **25**: 554. 1925.

T. ambigua (A. Gray) Rydb. Fl. Rocky Mts. 874. 1917, and ed. 2, 874. 1922.

Herbaceous perennial, canescent with fine appressed pubescence; caudex bearing tufted leaves; leaves narrowly spathulate to obovate, 1–3 cm. long, 0.3–0.8 cm. wide, lamina sometimes emarginate, narrowed into a petiole; flowering scapes 1–5 cm. long, naked or 1–2-bracted, sometimes leafy; heads 2–2.5 cm. in diameter including the rays; involucre 2–3-seriate; bracts oblong-lanceolate, acute, margins lacerate-ciliate; pappus of ray-flower similar to that of the disk but somewhat shorter; pappus of disk-flower plurisetose, exceeding the length of the corolla; achenes pubescent with bidentate hairs.

Distribution: Wyoming to northeastern California; also in New Mexico.

Specimens examined:

WYOMING: Holm Lodge, about 40 miles west of Cody, Park County, Aug. 26 and 27, 1922, *von Schrenk* (M).

NEW MEXICO: Santa Fe, 1847, *Fendler 351* (Phil.); without definite locality, *Kern* (in part) (Phil.).

UTAH: Rabbit Valley, alt. 2092 m., Aug. 6, 1875, *Ward 523* (U. S., TYPE of *T. scapigera* var. *ambigua*); Deep Creek, June 6, 1891, *Jones* (Pomona, No. 40882).

NEVADA: Monitor Valley, alt. 1538 m., July, 1868, *Watson 519* (US, TYPE of *T. scapigera* var. *caulescens*); eastern Nevada, 1883, *Meehan* (Phil.).

CALIFORNIA: Buffalo Ravine near Surprise Valley, Apr. 1879, *Lemmon 29* (M).

12. T. spathulata Nutt. Trans. Am. Phil. Soc. N.S. **7**: 305. 1841; Torr. & Gray, Fl. N. Am. **2**: 186. 1842; Eaton, Am. Nat. **8**: 213. 1874; Gray, Proc. Am. Acad. **16**: 86. 1880; Syn. Fl. N. Am. 1^2: 169. 1884, and ed. 2, 169. 1886 and 1888; Coulter, Man. Rocky Mt. Region, 158. 1885; Nelson in Coulter & Nelson, Man. Cent. Rocky Mts. 510. 1909; Rydb. Fl. Rocky Mts. 875. 1917, and ed. 2, 875. 1922.

T. condensata Eaton, Am. Nat. **8**: 213. 1874; Gray, Proc. Am. Acad. **16**: 83. 1880; Syn. Fl. N. Am. 1^2: 167. 1884, and ed. 2, 167. 1886 and 1888; Coulter, Man. Rocky Mt. Region, 157. 1885; Nelson in Coulter & Nelson, Man. Cent. Rocky Mts. 519. 1909; Rydb. Fl. Rocky Mts. 874. 1917, and ed. 2, 874. 1922.

T. Parryi var. *alpina* Gray, Proc. Am. Acad. **16**: 83. 1880; Syn. Fl. N. Am. 1^2: 167. 1884, and ed. 2, 167. 1886 and 1888; Coulter, Manual Rocky Mt. Region, 156. 1885.

T. alpina (Gray) Rydb. Mem. N. Y. Bot. Gard. **1**: 390. 1900; Nelson in Coulter & Nelson, Man. Cent. Rocky Mts. 509. 1909; Rydb. Fl. Rocky Mts. 874. 1917, and ed. 2, 874. 1922.

Caespitose perennial, 3–5 cm. high; leaves crowded, rosulate, obovate to spathulate, 1–1.5 cm. long, 0.2–0.4 cm. broad, densely subsericeous-villose to villose-lanate; heads sessile or pedunculate, 1–5 cm. in diameter including the rays; involucre usually serrate; bracts pinkish, oblong-lanceolate, those of the inner series with a weak attenuate apex, the narrow margins scarious, lacerate-ciliate; pappus of ray- and disk-flowers similar, composed of slender setae, as long as the corolla of the disk-flower; achenes pubescent with bidentate hairs.

Distribution: alpine and subalpine regions of southwestern Alberta and western Wyoming.

Specimens examined:

YELLOWSTONE NATIONAL PARK: Electric Peak, alt. 2770 m., July 26, 1902, *E. C. Smith* (F).

WYOMING: high alpine ridge between the valleys of the Stinking Water and the Yellowstone, 1873, *Parry 142* (F, M); northwestern Wyoming, 1873, *Parry 145* (F, G, M, TYPE of *T. Parryi* var. *alpina*); high alpine peak, Owl Creek Range, July, 1874, *J. D. Putnam* (G, TYPE of *T. condensata*); "Black Hills of Platte," *Nuttall* (Phil.); shale flats, Bush Ranch, June 10, 1910, *Nelson 7054* (R).

CANADA: High River, Rocky Mts., alt. 2308 m., July, 1884, *Dawson* (G).

Note: Dr. C. C. Parry says in a note accompanying the type of *T. condensata* Gray: "Single specimen from a high alpine peak, Owl Creek Range, by J. D. Putnam. I take this to be a condensed alpine form of 145." The head of Putnam's specimen is larger than in No. 145 and looks very much as if it were a fasciation of several heads. Otherwise, these specimens are identical. In the specimens cited the heads vary from 1 to 5 cm. in diameter. The presence of intermediates indicates that the size of the head cannot be used as a means of specific demarcation.

13. T. mexicana Gray, Mem. Am. Acad. N.S. (Pl. Fendl.) **4**: 70. 1849; Walp. Ann. Syst. Bot. **2**: 822. 1851–1852; Gray, Proc. Am. Acad. **16**: 86. 1880; Syn. Fl. N. Am. **1**^{2}: 169. 1884, and ed. 2, 169. 1886 and 1888; Hemsley, Biol. Cent.-Am. Bot. **2**: 118. 1881.

Caulescent; conspicuously cinereous with strigose pubescence; stems decumbent, simple or branched, 5–17 cm. long, leafy throughout; leaves linear, sometimes linear-spathulate, 1–2.5 cm. long, 0.1–0.2 cm. broad; heads usually solitary on terminal peduncles, 1–2 cm. in diameter including the rays; involucre distinctly 2-seriate; bracts of equal length and all very obtuse, membranous-margined; ray-flowers fertile with a much-reduced pappus; pappus of the disk-flowers equalling the corolla in length; achenes sparsely pubescent with glochidiate-tipped hairs.

Distribution: east central Mexico, southern Coahuila, Zacatecas to Hidalgo.

Specimens examined:

MEXICO:

COAHUILA: Saltillo, March 22, 1877, *Gregg 327* (M, TYPE); Saltillo, alt. 1650 m., June 5, 1909, *Arsène 3387* (M); Saltillo, Apr. 1–15, 1880, *Ed. Palmer 499* (F).

ZACATECAS; near Conception Del Oro, Aug. 11–14, 1904, *Ed. Palmer 252* (M); vicinity of Cedros, Aug., 1908, *Kirkwood 110* (F); low places, plains, Cedros, Aug., *Lloyd 110* (M).

HIDALGO: rocky flats and mountains, Ixmiquilpan, July, 1905, *Purpus 1345* (M, F); calcareous bluffs near Tula, alt. 2080 m.,

Aug. 6, 1896, *Pringle 6573* (M); dry calcareous rocks near Tula, alt. 2080 m., Sept. 16, 1902, *Pringle 9967* (M, F); calcareous plains near Pachuca, alt. 2350 m., Aug. 2, 1898, *Pringle 7580* (F, R).

14. T. strigosa Nutt. Trans. Am. Phil. Soc. N.S. **7**: 306. 1841; Torr. & Gray, Fl. N. Am. **2**: 186. 1842; Gray, Mem. Am. Acad. N.S. (Pl. Fendl.) **4**: 70. 1849, in part; Syn. Fl. N. Am. 1^2: 169. 1884, and ed. 2, 169. 1886 and 1888; Proc. Am. Acad. **16**: 86. 1880; Coulter, Man. Rocky Mt. Region, 158. 1885; Nelson in Coulter & Nelson, Man. Cent. Rocky Mts. 509. 1909; Rydb. Fl. Rocky Mts. 874. 1917, and ed. 2, 874. 1922; Tidestrom, Contr. U. S. Nat. Herb. **25**: 554. 1925.

T. Fendleri Gray, Mem. Am. Acad. N.S. (Pl. Fendl.) **4**: 70. 1849; Walp. Ann. Syst. Bot. **2**: 822. 1851–1852; Gray, Syn. Fl. N. Am. 1^2: 169. 1884, and ed. 2, 169. 1886 and 1888; Proc. Am. Acad. **16**: 86. 1880; Coulter, Man. Rocky Mt. Region, 158. 1885; Nelson in Coulter & Nelson, Man. Cent. Rocky Mts. 509. 1909; Wooton & Standley, Contr. U. S. Nat. Herb. **19**: 692. 1915; Rydb. Fl. Rocky Mts. 874. 1917, and ed. 2, 874. 1922.

Caulescent; cinereous with close strigulose pubescence, the caudex sending up a number of simple or branched stems, 3–25 cm. high, nearly naked below, leafy towards the inflorescence; leaves linear to linear-spathulate, 1–3 cm. long, 0.3–0.6 cm. broad, gradually narrowed into a slender petiole; heads subsessile and solitary or terminating the lateral branches in 1–3-headed clusters; heads about 1.5 cm. in diameter including the rays; involucre 2–4-seriate; bracts oblong-lanceolate, membranaceous-margined and lacerate-ciliate; ray-flowers about 15, rays pink or rose-purple, with a much-reduced pappus; pappus of disk-flowers plurisetose, as long as the corolla; achenes pubescent with glochidiate-tipped hairs. Plate 4.

Distribution: dry sandy soil, southwestern Wyoming to New Mexico and Arizona and adjacent Mexico.

Specimens examined:

Wyoming: dry flats 21 miles west of Green River, June 19, 1923, *Payson & Armstrong 3205* (M, R); Church Buttes, Fort Bridger, July, 1873, *Porter* (M, Phil.); without definite locality, *Parry* (Phil); Green River, May 30, 1897, *Nelson 3031* (M, R).

COLORADO: "R. Mts. Platte," *Nuttall* (Phil., TYPE); Salida, June 19, 1898, *Baker, Earle & Tracy 1016* (M); Texas Cr., Fremont Co., 1874, *Brandegee 951* (M); Arkansas River near Puncha Pass, Sept. 24, 1878, *Jones 767* (M); Huerfano, Aug., 1867, *Parry 93* (M, R); dry slopes, alt. 1662 m., Paradox, Montrose Co., June 17, 1912, *Walker 93* (M); adobe plains of San Juan Valley, July, 1875, *Brandegee* (M); southern Colorado, *Brandegee* (Phil.); sands of Huerfano Cr., Sept., 1875, *Brandegee* (M); McElmo Cr., June 3, 1892, *Eastwood* (F, No. 82217); alkaline hillsides, Naturita, 1662 m., May 19, 1921, *Payson 321* (F, M, R); Arkansas Valley, Sept., 1873, *Wolf 517* (F).

NEW MEXICO: near Espanola, Santa Fe Co., alt. 1723 m., May 17, 1897, *Heller & Heller 3547* (M); Mangas Springs, 18 miles northwest of Silver City, Grant Co., alt. 1323 m., Apr. 12, 1903, *Metcalfe 15* (M, R); Mesilla Valley, Dona Ana Co., alt. 1184 m., Apr. 19, 1907, *Wooton & Standley 3237* (M); sand hills near Mesilla, May 4, 1906, *Standley* (M); gravelly hillsides, Santa Fe, May–July, 1847, *Fendler 350* (M, *co-type* of *T. Fendleri*); El Paso, Apr., 1852, *Parry* (M); Santa Fe, 1891, *Alcott* (M, No. 890501); sandy banks of the Rio Grande and stony hills, El Paso, March–June, 1851–2, *Wright 1172* (Phil., M); without definite locality, *Kern* (Phil.); gravelly hills, Santa Fe, May, 1847, *Fendler 351* (Phil., M); Aztec, May 4, 1899, *Baker 728* (F, M, R); loamy flats, Hillsboro (N. Percha), Sierra Co., alt. 1692 m., Oct. 28, 1904, *Metcalfe 1510* (F, M); Mesilla Valley, Dona Ana Co., alt. 1154 m., Apr. 2, 1907, *Wooton & Standley* (F, M).

ARIZONA: dry spots in river bottoms, Rio Verde, Fort Whipple, Sept. 6, 1865, *Coues & Palmer 523* (M); sandy soil, Beaver Cr., Sept., 1903, *Purpus 8300* (M); *Smart 92* (F); *Voth 7* (F).

15. T. incana Nutt. Trans. Am. Phil. Soc. N.S. **7**: 305. 1841; Torr. & Gray, Fl. N. Am. **2**: 155. 1842; Walp. Rep. **2**: 575. 1843; Gray, Syn. Fl. N. Am. **1**^{2}: 169. 1884, and ed. 2, 169. 1886 and 1888; Proc. Am. Acad. **16**: 86. 1880; Coulter, Man. Rocky Mt. Region, 157. 1885; Nelson in Coulter & Nelson, Man. Cent. Rocky Mts. 509. 1909; Wooton & Standley, Contr. U. S. Nat. Herb. **19**: 692. 1915; Rydb. Fl. Rocky Mts. 875. 1917, and ed. 2, 875. 1922; Tidestrom, Contr. U. S. Nat. Herb. **25**: 554. 1925.

T. Fremontii Torr. & Gray, Boston Jour. Nat. Hist. 5: 106. 1845.

T. incana var. *ambigua* Jones, Zoe 4: 264. 1893.

T. incana var. *proliza* Jones, Contr. Western Bot. 13: 15. 1910.

Herbaceous perennial, strigulose-cinereous, caespitose; stem usually 3–6 cm. high; leaves spathulate, sometimes apiculate, petiolate, 2–4 cm. long and 0.2–0.5 cm. broad, the uppermost clustered at the base of the heads and seldom surpassing them in length; heads 1–2.5 cm. in diameter including the rays, usually sessile; involucre 2–3-seriate; bracts broadly lanceolate, their scarious margins lacerate-ciliate; pappus of the disk-flower plurisetose, equalling the length of the corolla; pappus of the ray-flower similar to that of the disk-flower but only one-third to one-half as long; achenes pubescent with glochidiate-tipped hairs.

Distribution: Wyoming, south through western Colorado into northwestern New Mexico, west into eastern Arizona and Utah.

Specimens examined:

WYOMING: "Black Hills of the Platte," *Nuttall* (Phil., TYPE); on a stony flat, Granger, Uinta Co., June 14, 1899, *A. & E. Nelson 5403* (M, R); Granger, June 10, 1898, *A. Nelson 4622* (M, R); deep hot sands, Alcova, Natrona Co., July 1, 1901, *Goodding 166* (M, R).

COLORADO: dry rocky south slope, Norwood Hill, San Miguel Co., alt. 2154 m., Aug. 11, 1912, *Walker 448* (M, R); Grand Junction, May, 1891, *Eastwood* (F, Pomona); Grand Junction, June, 1892, *Eastwood* (F, Pomona); Grand Junction, Apr. 15, 1891, *Jones* (Pomona, No. 39662); Grand Junction, alt. 1412 m., June 11, 1901, *Baker 105* (M).

NEW MEXICO: Aztec, May 6, 1899, *Baker 729* (M, R).

UTAH: stony slopes, Thompson Springs, alt. 1630 m., May–Oct., 1899, *Purpus 6765* (M); Thompson Springs, May 7, 1891, *Jones* (Pomona, No. 39664, TYPE of *T. incana* var. *ambigua*); Richfield, alt. 1692 m., June 5, 1875, *Ward 176* (F, M); Lower Crossing, alt. 1384 m., July 2, 1898, *Jones* (M, No. 121121); Westwater, May 6, 1891, *Jones* (Pomona, No. 39663); Westwater, alt. 1380 m., June 28, 1898, *Jones* (Pomona, No. 39629);

Chepeta Well, alt. 1540 m., May 23, 1908, *Jones* (Pomona, No. 39630, TYPE of *T. incana* var. *prolixa*).

ARIZONA: near Oraibi, 1900, *Voth 19* (F); Hackberry, May 26, 1884, *Jones 4516* (F, R).

16. T. arizonica Gray, Proc. Am. Acad. **16:** 85. 1880; Syn. Fl. N. Am. **1**[2]**:** 169. 1884, and ed. 2, 169. 1886 and 1888; Wooton & Standley, Contr. U. S. Nat. Herb. **19:** 692. 1915; Rydb. Fl. Rocky Mts. 875. 1917, and ed. 2, 875. 1922; Tidestrom, Contr. U. S. Nat. Herb. **25:** 554. 1925.

T. arizonica × *incana* Jones, Zoe **2:** 248. 1891.

Depressed subacaulescent and multicipital, branching from a perennial root, forming a loose pulvinate tuft 3–4 cm. high, minutely sericeous-canescent; leaves short, obovate-spathulate, 2–3 cm. long, 0.2–0.5 cm. broad, seldom surpassing the foliose-fulcrate heads; heads 1–1.5 cm. in diameter including the rays; involucre 2–3-seriate; bracts lanceolate, obtuse, with narrow, membranaceous lacerate-ciliate margins; pappus of the disk-flower plurisetose, equalling the length of the corolla, that of the ray-flower similar but shorter.

Distribution: southwestern Colorado and Arizona; doubtless also in Utah.

Specimens examined:

COLORADO: Naturita, June 1, 1917, *Payson 989* (M, R); rocky hillside, Naturita, alt. 1670 m., Apr. 21, 1914, *Payson 242* (F, M, R); dry arroyo sides, Paradox, Montrose Co., alt. 1666 m., June 17, 1912, *Walker 90* (M, R); Paradox, Montrose Co., alt. 1354 m., *Walker 206* (R); Grand Junction, Mesa Co., May 31, 1921, *Osterhout 6116* (R).

ARIZONA: Buckskin Mts., June 19, 1890, *Jones* (Pomona, No. 39642, TYPE of *T. arizonica* × *incana*); Milford, alt. 1540 m., June 19, 1880, *Jones 1794* (F, M); Ash Fork, May 13, 1883, *Rusby 660* (M); "southern Utah, northern Arizona, &," *Palmer 204* (M).

17. T. leptotes (Gray) Osterh. Muhlenbergia **4:** 69. 1908; Rydb. Fl. Rocky Mts. 875. 1917, and ed. 2, 875. 1922.

T. sericea var. *leptotes* Gray, Proc. Am. Acad. **16:** 85. 1880;

Coulter, Man. Rocky Mt. Region, 157. 1885; Gray, Syn. Fl. N. Am. 1²: 169. 1884, and ed. 2, 1886 and 1888.

T. lepotes Osterh. Muhlenbergia **4**: 69. 1908 (doubtless a typographical error, since the bibliographical citation in synonymy refers to var. *leptotes* Gray).

Acaulescent; leaves pubescent with hirsute appressed hairs, narrowly linear, attenuate at the base, 2–4 cm. long, 0.1–0.2 cm. broad, surpassing the shortly pedunculate or sessile heads; heads about 1.5 cm. in diameter including the rays; involucre 3–4-seriate; bracts broadly linear, their membranaceous margin scarcely wider than the lacerate ciliation; pappus of ray- and disk-flowers similar, plurisetose, setae equalling the length of the corolla of the disk-flower, rarely shorter; achenes only sparsely pubescent with glochidiate-tipped hairs.

Distribution: known only from the Middle Park region of Colorado.

Specimens examined:

COLORADO: Middle Park, coll. of 1864, *Parry* (G, TYPE; M, *co-type*, No. 121020); "Estes Park," coll. of 1864, *Parry* (F, No. 209717); Kremmling, Grand Co., June 22, 1907, *Osterhout 8487* (R); Kremmling, Grand Co., May 26, 1915, *Osterhout 5221* (R).

18. T. exscapa (Richards.) Porter, Mem. Torr. Bot. Club **5**: 321. 1894, in part, as to name-carrying synonym; Nelson in Coulter & Nelson, Man. Cent. Rocky Mts. 509. 1909, in part, excluding synonym *T. sericea;* Wooton & Standley, Contr. U. S. Nat. Herb. **19**: 692. 1915; Rydb. Fl. Rocky Mts. 875. 1917, and ed. 2, 875. 1922, as to name only; Tidestrom, Contr. U. S. Nat. Herb. **25**: 554. 1925, in part, excluding *T. sericea* and *T. mensana.*

Aster ? exscapus Richards. Frankl. Jour. Bot. App. 7, p. 748. 1823.

T. sericea Hook. Fl. Bor. Am. **2**: 16. 1834, in part, as to synonym, *Aster exscapus,* and plant of Richardson; DC. Prodr. **7**: 273. 1838, in part; Walp. Rep. **2**: 575 and 957. 1843, in part, as to *Aster exscapus;* Torr. & Gray, Fl. N. Am. **1**: 185, 1842, in part, as to *Aster exscapus* and plant of Richardson; Gray, Proc.

Am. Acad. **16**: 85, 1880, in part, as to *Aster exscapus;* Syn. Fl. N. Am. **1**²: 168. 1884, and ed. 2, 168. 1886 and 1888, in part, as to *Aster exscapus.*

T. Wilcoxiana Wood, Bull. Torr. Bot. Club **6**: 163. 1875; Gray, Proc. Am. Acad. **16**: 84. 1880; Syn. Fl. N. Am., ed. 2, **1**²: 168. 1886 and 1888; Coulter, Man. Rocky Mt. Region, 157. 1885; Rydb. Fl. Rocky Mts. 875. 1917, and ed. 2, 875. 1922.

T. sericea β *papposa* Gray, Mem. Am. Acad. N. S. (Pl. Fendl.) **4**: 70. 1849; Proc. Am. Acad. **16**: 84. 1880; Syn. Fl. N. Am. **1**²: 168. 1884, and ed. 2, 168. 1886 and 1888.

T. exscapa Wilcoxiana (Wood) A. Nels. in Coulter & Nelson, Man. Cent. Rocky Mts. 510. 1909.

T. intermedia Rydb. in Britton's Manual Fl. N. States and Canada, 944. 1901, and ed. 2, 944. 1905; Rydb. Fl. Rocky Mts. 875. 1917, and ed. 2, 1922; Tidestrom, Contr. U. S. Nat. Herb. **25**: 554. 1925.

Depressed, acaulescent, rising from a woody root-stalk; leaves linear-spathulate, 2–5 cm. long and 0.2–0.5 cm. broad, somewhat apiculate, sparsely pubescent with fine appressed hairs, somewhat glabrate; heads large, 2–3 cm. high and 3–5 cm. in diameter including the rays; involucre 4–6-seriate; bracts linear-lanceolate, obtuse, pink-tipped with membranaceous lacerate-ciliate margins; pappus of ray- and disk-flowers similar, plurisetose of elongated setae exceeding the length of the corolla of the disk-flower; achenes pubescent with glochidiate-tipped hairs.

Plate 7, figs. 29–31.

Distribution: plains from southern Alberta and Saskatchewan, south to Texas and west to Arizona; also in southern Colorado.

Specimens examined:

South Dakota: clay-hills, near Hot Springs, May 10, 1924, *McIntosh 21* (R); hills near Hot Springs, June 2, 1924, *McIntosh 166* (R).

Kansas: Trego Co., *Rich 718* (R, M, iso-type of *T. intermedia*); Clark Co., *Curtis* (M, No. 121174); arid sterile slopes near Cullison, March 31, 1888, *Norris* (M, No. 121175); gravelly hills collected within a radius of five miles of Osborne City, April 16, 1894, *Shear 2* (M).

Oklahoma: vicinity of Camp Supply, Woodward, Apr. 5, 1925, *Wilcox* (F, M); hillside, Alva, Apr. 17, 1913, *Stevens 216* (M).

Texas: infrequent, rocky slopes, alpine, March 22, 1919, *Hanson* (M); rare on high mountains, Limpia, March, 1914, *Allen 36* (M); calcareous bluffs, Falls Creek, Hood Co., Apr, 1884, *Reverchon 1533* (F, M).

Colorado: near foothills, Fort Collins, Apr. 19, 1898, *Crandall 3132* (F, R); plains, Colorado Springs, May 4, 1878, *Jones 25* (F); Cheyenne Canyon, May 4, 1891, *Smith* (M, No. 121177); Canyon City, Apr. 1875, *Brandegee* (M); Rocky Mountain Fl., 39–41° lat., 1862, *Hall & Harbour 290* (F, No. 456674; M, No. 121176); Los Pinos, May, 1899, *Baker 730* (F, M, R); vicinity of New Winsor, May 11, 1899, *Osterhout* (R, F, No. 118369); Evans, 1909, *Johnston 253 A* (M); dry hillside, Naturita, *Payson 326* (M, R).

New Mexico: Raton Mts., Colfax Co., March 23, 1848, *Gordon 42* (M); sloping hillsides on grassy plains, Santa Fe, Apr.-May, 1847, *Fendler 349* (M, *co-type* of *T. sericea* β *pappposa*); near Silver City, March 29, 1889, *Greene* (F).

Arizona: Flagstaff, May–Oct., 1902, *Purpus 4* (M); vicinity of Flagstaff, alt. 2154 m., June 2, 1898, *MacDougal 31* (F, R); Prescott, 1876, *Palmer* (F, No. 208510); Bright Angel, May 18–27, 1903, *Griffiths 4361* (M); Fort Whipple, May, 1865, *Coues & Palmer 365* (M); Fort Whipple, Apr. 20, 1865, *Coues & Palmer 315* (M).

Canada: at Carlton House, *Richardson* (Kew, type); sand hills, Aweme, Manitoba, May 28, 1900, *Criddle* (M); quite rare at Briggs Creek, Elbow River, Alberta, June 26, 1897, *Macoun* (C); dry slope, Medicine Hat. Alberta, May 9, 1894, *Spreadborough* (C); sandy hills, Aweme, Alberta, May 20, 1905, *Criddle 900* (M).

19. T. sericea Hook. Fl. Bor. Am. **2**: 16, *pl. 119*. 1834, in part, excluding synonym; DC. Prodr. **7**: 273. 1838, in part; Nutt. Trans. Am. Phil. Soc. N. S. **7**: 304. 1841; Walp. Rep. **2**: 575 and 957. 1843, in part, excluding *Aster exscapus;* Torr. & Gray, Fl. N. Am. **2**: 185. 1842, excluding *Aster exscapus* and the plant of Richardson; Gray, Proc. Am. Acad. **16**: 85. 1880, in part; Syn. Fl. N. Am. **1**[2]: 168. 1884, and ed. 2, 168. 1886 and 1888, in part, as to plant from "Rocky Mountains in lat. 54°."

T. mensana Jones, Contr. Western Bot. 13, p. 15. 1910.

T. exscapa Porter in Mem. Torr. Bot. Club **5**: 321. 1894, in part, as to synonym *T. sericea;* Nelson in Coulter & Nelson, Man Cent. Rocky Mts. 509. 1909, in part, as to synonym *T. sericea;* Rydb. Fl. Rocky Mts. 875. 1917, and ed. 2, 875. 1922, in part, as to synonyms; Tidestrom, Contr. U. S. Nat. Herb. **25**: 554. 1925, in part, as to *T. sericea* and *T. mensana.*

Depressed, acaulescent, rising from a woody perennial caudex; leaves linear-lanceolate to subterete, 1–4 cm. long, 0.2–0.3 cm. wide, clustered at the base of the sessile heads, canescent with dense closely appressed sericeous pubescence, the older leaves conspicuously exceeding the head; heads 1–1.5 cm. in diameter including the rays; involucre 4–5-seriate; bracts pinkish, linear-lanceolate, acute with narrow membranaceous lacerate-ciliate margins; pappus of the disk-flower plurisetose, equalling the length of the corolla; pappus of the ray-flower variable from reduced squamellae little longer than the breadth of achene to a condition similar to that in the disk-flower; achenes pubescent with glochidiate-tipped hairs. Plate 6; pl. 7, fig. 32–34.

Distribution: Rocky Mountains, Alberta to Colorado and Utah; also in the Black Hills of South Dakota.

Specimens examined:

South Dakota: dry hillside near Pringle, alt. 1508 m., Apr. 19, 1909, *Murdoch 3510* (F).

Montana: Helena, 1892, *Newton* (F); Gallatin Co., June, 1888, *Tweedy 20* (F); Custer, Apr. 12, 1890, *Blankinship 147* (M); chiefly on the plains, Helena, May 18, 1887, *Anderson* (M, No. 121170).

Wyoming: Laramie, May 8, 1897, *A. Nelson 2862* (F); Laramie Hills, Apr. 28, 1896, *A. Nelson 1883* (F); Laramie plains, Apr. 12, 1894, *A. Nelson 7* (F, M); Laramie, Albany Co., May, 1899, *A. Nelson 7055* (M, R); March 8, 1860, *Hayden* (M, No. 121166); March 25, 1860, *Hayden* (M, No. 121161); Deer Creek, west of Fort Laramie, Apr. 15, 1860, *Hayden* (M, No. 121160); head of Muddy Creek, May 4, 1860, *Hayden* (M, No. 121167); Shoshone Mts., May, 1907, *Hapeman* (M, No. 867626).

Colorado: near Boulder, Apr. 1901, *Ramaley 654* (R); Rocky Mts., 39–41° lat., 1862, *Hall & Harbour 290* (F, Nos. 314634 and 17721); Larimer Co., March 30, 1896, *Baker 1250* (F, M); West

Cliff, Custer Co., Apr. 1888, *Cockerell* (F, No. 352961); steep slope of "The Mesa," alt. 2738 m., Apr. 23, 1911, *Murdoch 4503* (F, M); Georgetown, June, 1873, *Wolf 416* (F); Middle Park, 1861, *Parry 35* (F); Denver, May, 1894, *Bethel* (F, No. 91820); dry hills, Mt. Vernon, canyon, Jefferson Co., alt. 1730 m., Apr. 13, 1920, *Clokey 4338* (F, R); foothills west of Fort Collins, alt. 1692 m., March 3, 1896, *Baker* (M, No. 121168); Gregory Canyon, Boulder, Boulder Co., May 21, 1912, *Vestal 368* (M); infrequent, upper mesas near Boulder, alt. 1477 m., March 19, 1921, *Hanson c160* (M); South Park, Aug., 1873, *Rothrock* (F, No. 304922 in part).

Utah: Theodore, Benches of the Uintas, alt. 2308 m., May 14, 1908, *Jones* (Pomona, No. 40603, type of *T. mensana*).

Canada: Rocky Mountains, *Drummond* (Kew, type; also C, No. 7710); clay banks, Medicine Hat, Apr. 22, 1894, *Spreadborough & Macoun* (C, M); hillsides, Sweet Grass Hills, July 15, 1895, *Macoun* (C); Fort McLeod, Alberta, coll. of 1888, *Cowdry* (C).

Species Excluded

Townsendia Wrightii Gray, Bot. Mex. Bound. Surv. p. 78. 1859 = Aster Wrightii Gray, Pl. Wright. Part II, p. 75. 1853.

List of Exsiccatae

The distribution numbers are printed in *italics*. The number in parenthesis is the species number used in this revision.

Aiton, G. B. (1).
Alcott, W. P. (3); (14).
Allen, Miss E. A. *36* (18).
Anderson, F. W. (1); (19).
Arsène, Bro. G. *5387* (13).
Baker, C. F. (4); *727* (6); *728* (14); *105*, *729* (15); *730* (18); *1250* (19).
Baker, C. F., Earle, F. S., and Tracy, S. M. *548* (6); *1016* (14).
Bethel, E. (19).
Bethel, E., Willey, F. S., and Clokey, I. W. *4340* (6).
Blankinship, J. W. *501*, *501a* (1); *147* (19).
Brandegee, T. S. (3); *487* (4); (10); *951* (14); (18).
Brumback, Miss F. M., and Davis, Miss C. A. *178* (4).
Burglehaus, F. H. (1).
Carleton, M. H. (4).
Clokey, I. W. *2810* (4); *4338* (19).
Cockerell, T. D. A. (19).
Cotton, J. S. *1361* (10).
Coues, E., and Palmer, E. *523* (14); *315*, *365* (18).
Cowdry (19).
Crandall, C. S. (4); *3132* (18).
Criddle, M. *900* (18).
Curtis, C. (18).
Cusick, W. C. *2295* (1); *2294* (8); *1935* (9); *2616* (10).
Dawson, G. M. (12).

Smith, E. C. *16* (1); (12); (18).
Spreadborough, W. (18).
Spreadborough, W., and Macoun, J. (19).
Standley, P. C. *4412*, *4621* (3); (14).
Starr, E. (1).
Stevens, G. W. *216* (18).
Tweedy, F. *228*, *695* (1); *20* (19).
Umbach, L. M. *142*, *254* (1).
Vasey, G. R. (3); *304* (4).
Vestal, A. A. *368* (19).
Visher, S. S. *2138* (4).
Von Schrenk, H. (11).
Voth, H. R. *7* (14); *19* (15).
Vreeland, F. K. *639* (3).
Walker, E. P. *93* (14); *448* (15); *90*, *206* (16).
Walker, Mrs. S. B. (4).
Ward, L. F. *92* (9); *523* (11); *176* (15).
Watson, S. *519* (11).
Webber, H. J. (4).
Wilcox, T. E. (18).
Williams, T. A. (4).
Wolf, J. *517* (14); *416* (19).
Wooton, E. O. (2).
Wooton, E. O. and Standley, P. C. *3237* (14).
Wright, C. *1172* (14).
Young, M. S. (5).
Young, R. T. (4).

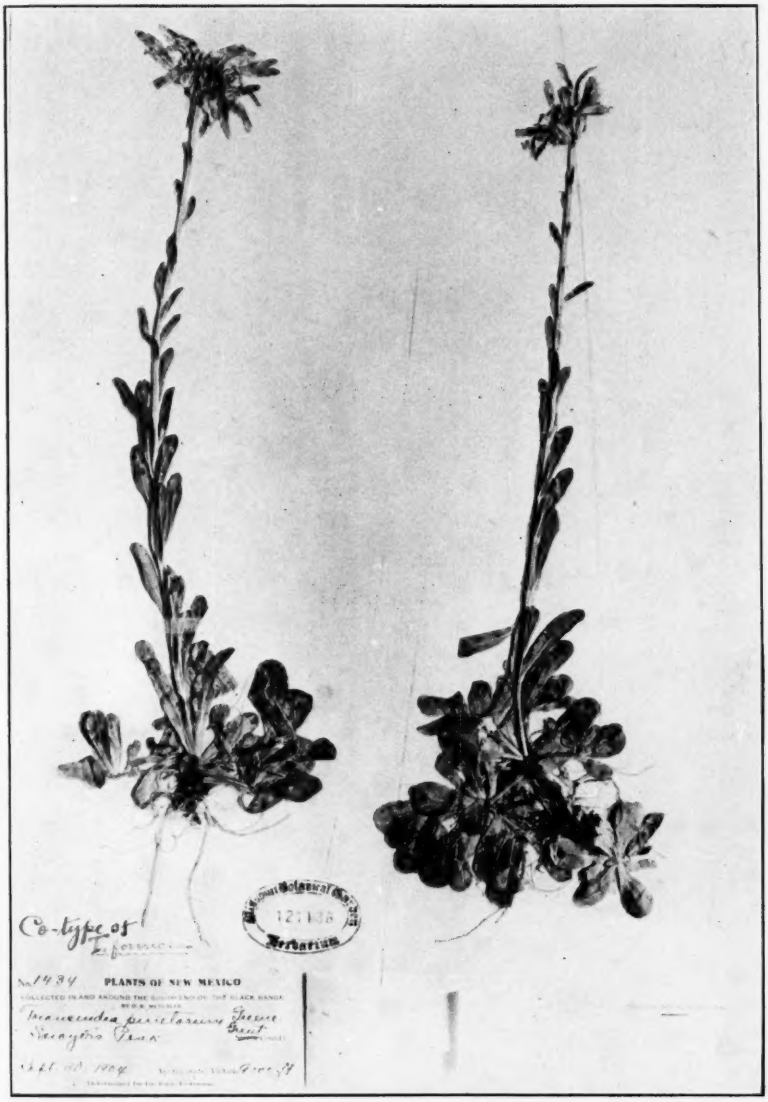
Index to Species

New species and combinations are printed in **bold face** type; synonyms in *italics;* and previously published names in ordinary type.

Explanation of Plate

PLATE 2

Townsendia formosa Greene
New Mexico
From a co-type, *Metcalfe No. 1434*, in the Missouri Botanical Garden Herbarium.



LARSEN—REVISION OF THE GENUS TOWNSENDIA

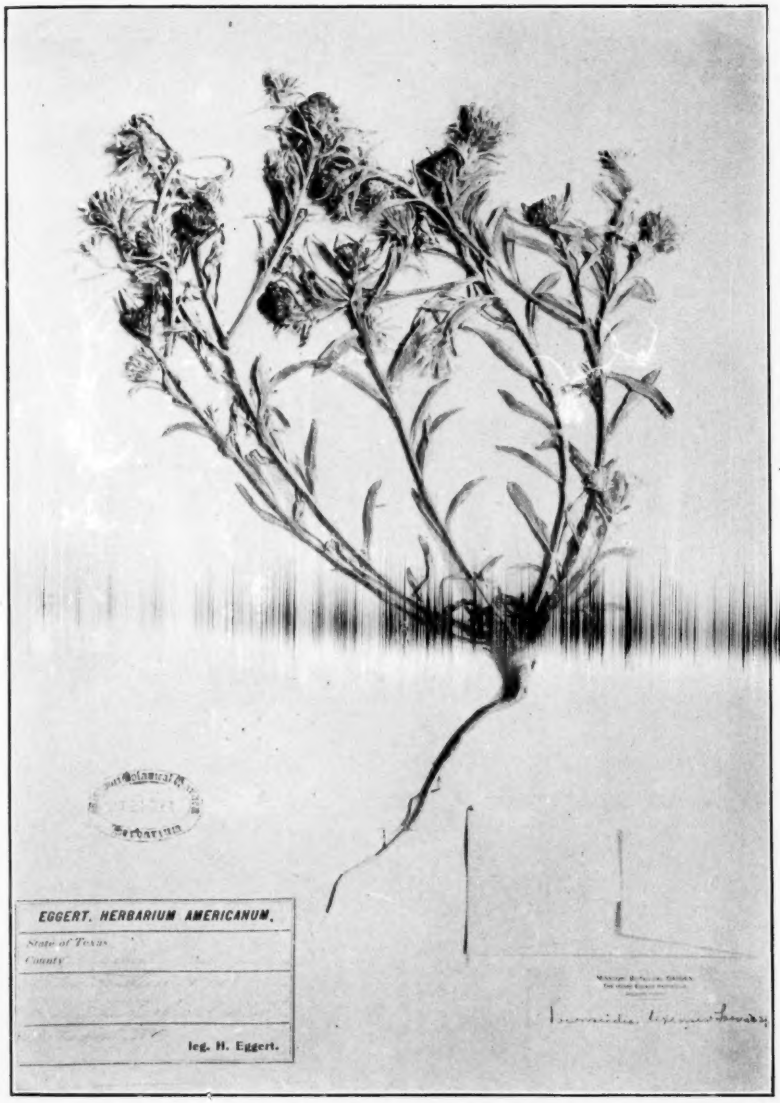
Explanation of Plate

PLATE 3

Townsendia texensis Larsen

Northwestern Texas

From the type specimen, *Eggert*, in the Missouri Botanical Garden Herbarium No. 121021.



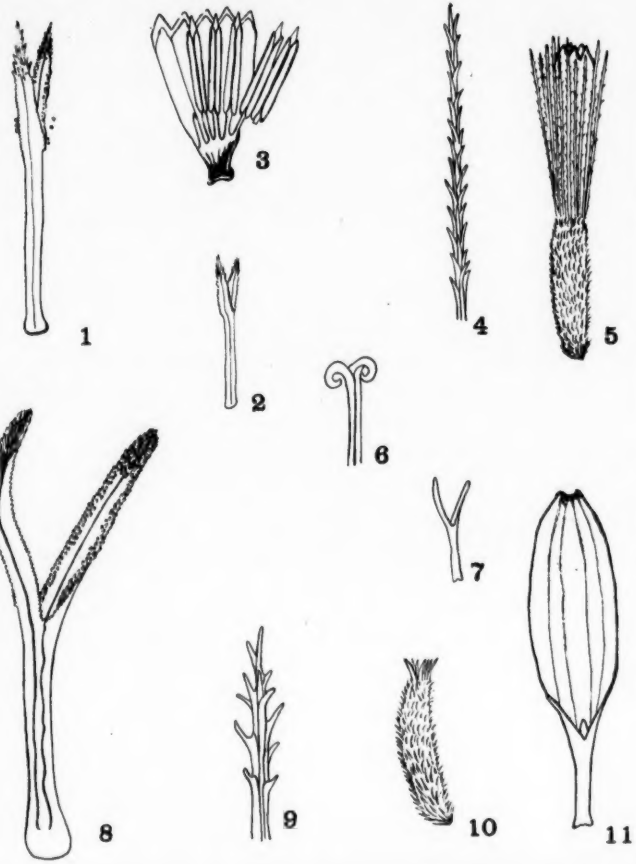
LARSEN—REVISION OF THE GENUS TOWNSENDIA

Explanation of Plate

PLATE 4

Townsendia strigosa Nuttall

Fig. 1. Style-branches of the disk-flower, greatly enlarged.
Fig. 2. Style-branches of the disk-flower, × 5.
Fig. 3. Corolla of the disk-flower showing the stamens, × 5.
Fig. 4. A seta of the disk-flower, greatly enlarged.
Fig. 5. Disk-flower, × 5.
Fig. 6. Glochidiate-tipped hair, greatly enlarged.
Fig. 7. Style-branches of the ray-flower, × 5.
Fig. 8. Style-branches of the ray-flower, greatly enlarged.
Fig. 9. A seta of the ray-flower, greatly enlarged.
Fig. 10. Achene of the ray-flower with pappus attached, × 5.
Fig. 11. Corolla of the ray-flower, × 5.
Fig. 12. Photograph of the type specimen in the Herbarium of the Academy of Natural Sciences, Philadelphia.



ANN. MO. BOT. GARD., VOL. 14. 1927

Explanation of Plate

PLATE 5

T. eximia Gray.

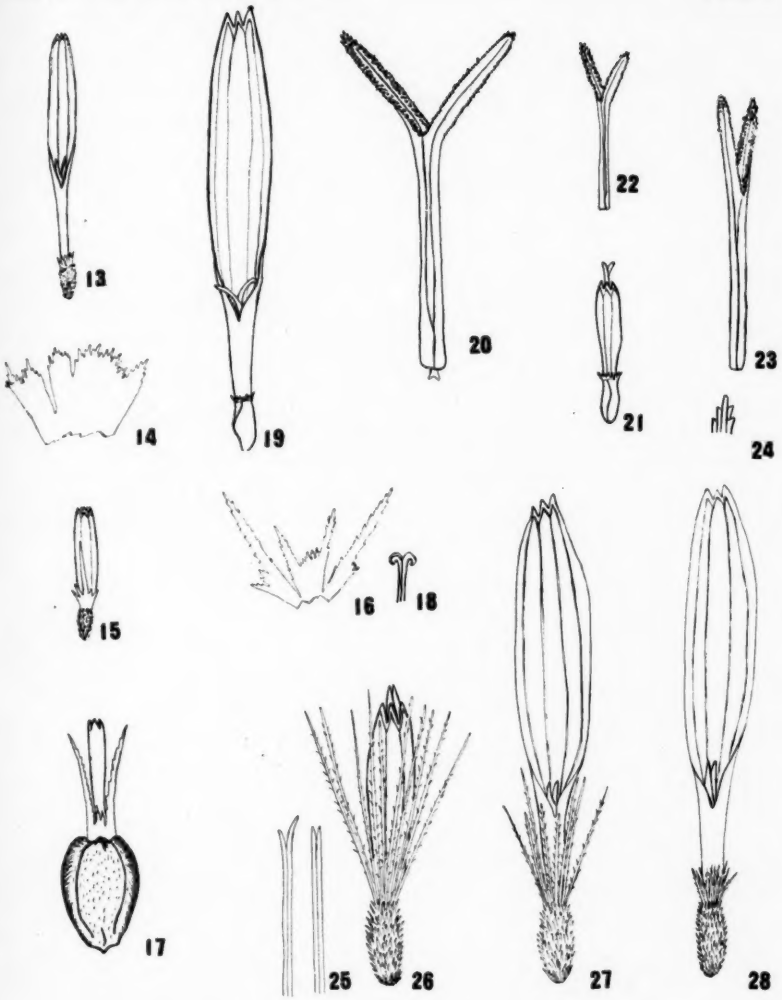
Fig. 13. Ray-flower, × 2½.
Fig. 14. Pappus of the ray-flower, greatly enlarged.
Fig. 15. Disk-flower, showing a single elongated seta in the pappus, × 2½.
Fig. 16. Pappus of the disk-flower, greatly enlarged.
Fig. 17. Achene of the disk-flower with the corolla and pappus attached.
Fig. 18. Glochidiate-tipped hair.

T. formosa Greene.

Fig. 19. Ray-flower, × 2½.
Fig. 20. Style-branches of the ray-flower, greatly enlarged.
Fig. 21. Disk-flower, × 2½.
Fig. 22. Style-branches of the disk-flower, × 5.
Fig. 23. Style-branches of the disk-flower, greatly enlarged.
Fig. 24. A seta of the pappus, greatly enlarged.

T. florifer Gray.

Fig. 25. Bidentate hairs, greatly enlarged.
Fig. 26. Disk-flower, × 5.
Figs. 27 and 28. Ray-flowers from the same head showing the variability of the pappus, × 5.



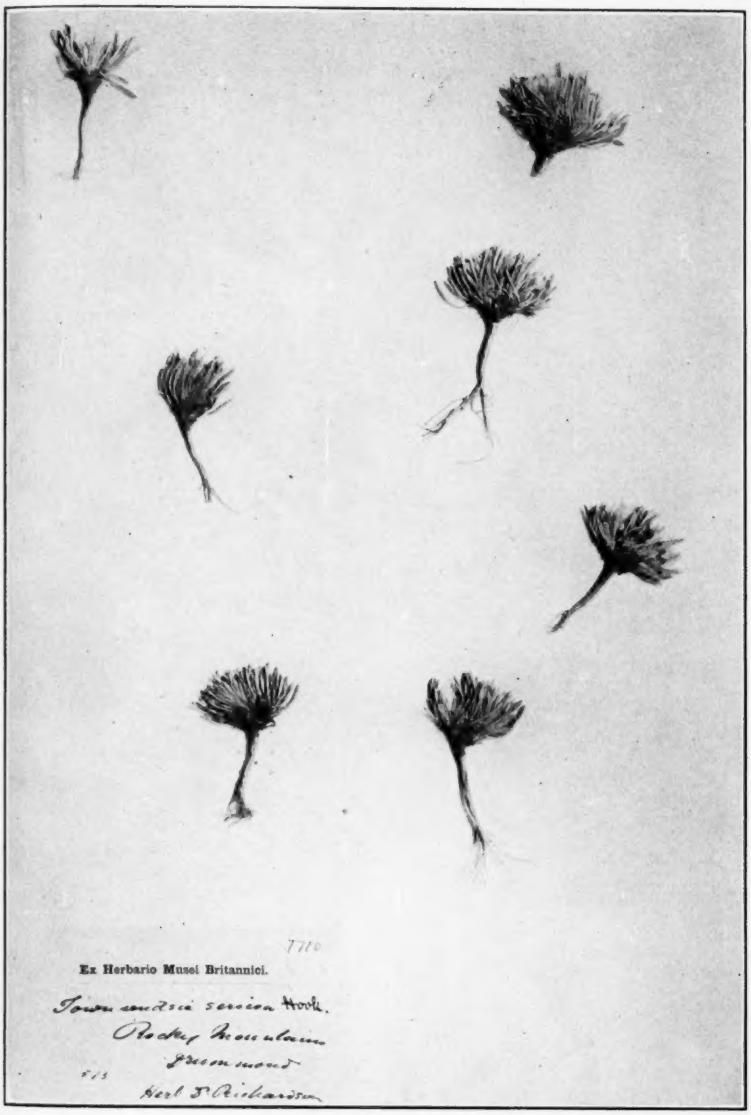
LARSEN—REVISION OF THE GENUS TOWNSENDIA

Explanation of Plate

PLATE 6

Townsendia sericea Hook.

From a co-type, *Drummond*, in the National Herbarium of the Victoria Memorial Museum, Ottawa, Canada, No. 7710.



LARSEN—REVISION OF THE GENUS TOWNSENDIA

Explanation of Plate

PLATE 7

Townsendia exscapa (Richards.) Porter.

Fig. 29. Photograph of type specimen in Kew Herbarium.
Fig. 30. Ray-flower, × 5.
Fig. 31. Disk-flower, × 5.

Townsendia sericea Hook.

Fig. 32. Photograph of type specimen in Kew Herbarium.
Fig. 33. Ray-flower, × 5.
Fig. 34. Disk-flower, × 5.


HERB. HORT. BOT. REG. KEW.
Aster (?) exscapus Richards.
Type
29


2
HERB. HORT. BOT. REG. KEW.
Townsendia sericea Hook.
Type
32


30
31


33
34

STUDIES ON SOUTH AMERICAN LABIATAE. III[1]

Synopsis of the Genus Satureia

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Satureia (Tourn.) L.

Gardoquia Ruiz et Pavon, Prodr. 86, *pl. 17*. 1794.

Rizoa Cav. in Anal. Cienc. Nat. **3**: 133. 1801.

Xenopoma Willd. in Ges. Naturforsch. Fr. Berlin, Mag. **5**: 399. 1811.

Thymus Kunth in Humboldt et Bonpland, Nov. Gen. et Sp. Pl. **2**: 315. 1817 (non L.); Swartz, Prodr. Veg. Ind. Occ. 89. 1788.

Micromeria Benth. in Bot. Reg. **15**: sub *pl. 1282*. 1829.

Herbae perennes vel suffrutices in regione nostra, habitu diverso internodiis saepius foliis aequilongis vel brevioribus; foliis maximam partem parvis, non rugosis, venis saepe prominulis, margine integra vel subserrata; floribus in cymulis nunc patentibus nunc densis in foliorum superiorum axillis, rarius solitariis; calycibus tubulosis, fere cylindratis maturis non auctis, saepius 13-venis, venis prominulis, dentibus aequalibus vel patenter bilabiatis, erectis, intus saepius hirsutis; corollae tubo saepius exserto, frequenter subincluso, superne gradatim ampliato, intus frequenter villoso; labro erecto, subintegro vel bifido, breviore, labiolo quam labro paulo longiore, trifido, lobo medio majore et subpatente; staminibus 4, supra tubi medium saepius sitis, didymis, posticis paulo brevioribus, filamentis glabris, connectivo crasso thecas saepius separante, his late divaricatis, rarius subparallelis; stylo paulo exserto, inaequaliter bifido; nuculis oblongis, saepius apice obtusis, rarius apiculatis.

Satureia in the region under consideration is a genus of a certain diversity of habit and flower character, the species of

[1] Issued June 8, 1927

which, however, form a continuous and interlocking series, so that subgeneric lines are difficult to distinguish. As concluded by Briquet,[1] the proposed genera *Gardoquia*, *Xenopoma*, and *Micromeria* are confluent, and the study of species herein described and unknown to him have strengthened this conclusion.

The primary differentiating characters of the genus *Gardoquia* were the long, recurved corolla-tube, the erect emarginate upper lip of the corolla, and the didymous cordate anthers. The genus was maintained by Bentham with the following note "Genus a *Micromeria* non nisi longitudine corollarum, limbique lobis suberectis, distinctum," [2] while *Micromeria* (including *Xenopoma*) in turn was separated from *Satureia* on the basis of the narrower calyx and the character of its venation. With the present series of species these characters are insufficient. *Rizoa* is wholly synonymous with *Gardoquia*, being based on *Gardoquia multiflora* R. & P.

CONSPECTUS SPECIERUM

A. Flores in axillis solitarii, pedicellis calyces subaequantibus vel longioribus elatis, bracteolis absentibus.....*1. S. Brownei*

AA. Flores 3–6 et ultra in axillis vel solitarii, pedicellis quam calycibus brevioribus, bracteolis praesentibus.

B. Herbae fruticulique humiles, altitudine 5–20 cm., floribus in axillis solitariis.

C. Bracteola ad pedicellorum medium sita; folia obovata, margine integra.

D. Calyces 13-venis, dentibus duobus anticis quam posticis subduplo longioribus, erectis.....*33. S. pusilla*

DD. Calyces 15-venis, dentibus subaequalibus, subconniventibus.....*32. S. Darwinii*

CC. Bracteola ad pedicellorum basim sita; folia ovata vel rotundato-ovata, margine leniter crenata.....*31. S. nubigena*

BB. Suffrutices vel frutices, altitudine 30–200 cm., floribus 1–6 et ultra in axillis.

C. Calyces 1.5–3.5 mm. longi, corollae tubo incluso vel paulo exserto rarius quam calyce duplo longiore.

D. Calyces 1.5–2 mm. longi, corollae tubo incluso.

E. Folia utrinque glabra, anguste lanceolata, acuta.....*37. S. axillaris*

EE. Folia puberula vel pubescentia, oblonga, obtusa.....*39. S. oligantha*

DD. Calyces 3–3.5 mm. longi, corollae tubo breviter exserto.

E. Folia ovata vel rotundato-ovata, leniter crenata.....*34. S. vana*

EE. Folia lanceolata, oblanceolata vel ovata, subintegra.

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[1] Briquet, J. in Engler u. Prantl, Nat. Pflanzenfam., ed. 1, IV. Abt. 3a, 296. 1897.

[2] Bentham, G. in DC. Prodr. 12: 235. 1848.

F. Folia lanceolata, acuta; flores saepius tres in axillis. ..... *36. S. simulans*

FF. Folia oblanceolata, oblonga vel ovata, obtusa; flores saepius solitarii.

G. Calyces subturbinati; corollae 7 mm. longae; folia ovalia vel elliptica, 3–5 mm. longa..... *38. S. brevicalyx*

GG. Calyces tubulosi; corollae 9 mm. longae; folia oblanceolata vel oblonga, .5–1.5 cm. longa..... *35. S. boliviana*

CC. Calyces 4.5–10 mm. (3.5–4 mm. in *S. rigidula* et *breviflora*), saepius 6–8 mm. longi, corollae tubo saepius longe exserto quam calycibus duplo triplove longiore.

D. Folia 2–5 cm. longa, sat tenuia, ovata vel elliptica, crenato-serrata; flores 3–3.5 cm. longi.

E. Flores pedicellis gracilibus calyces subaequantibus elevati; calyces glabri..... *2. S. multiflora*

EE. Flores pedicellis quam calycibus brevioribus; calyces extus villosi..... *3. S. elliptica*

DD. Folia raro 3 cm. longa, saepius .5–1.5 cm. vel breviora, forma diversiore saepius integra; flores saepius 2–2.5 cm. longi.

E. Folia obovata vel oblanceolata, omnino obtusa; calycis dentes acuminati (acuti in *S. guamaniensis*) etiam subaristati.

F. Folia rhomboideo-obovata, vel subrotunda.

G. Folia rhomboideo-obovata, subtus puberula; flores fere 2 cm. longi..... *6. S. Matthewsii*

GG. Folia rotunda, subtus parce villosa; flores vix 6 mm. longi. ..... *8. S. breviflora*

FF. Folia oblanceolata.

G. Flores in axillis solitarii..... *7. S. guamaniensis*

GG. Flores 3–7 in axillis..... *5. S. Gilliesii*

EE. Folia elliptico-lanceolata, ovata, vel linearia, raro obtusa; calycis dentes saepius acuti, raro subaristati (*S. Lindeniana, rigidula, glabrata*).

F. Folia 1–2.5 cm. longa, acuta (frequenter obtusa in *S. tomentosa*) pagina superiore subglabra, inferiore incana (sericea in *S. acutifolia*).

G. Calyces vix 5 mm. longi, tubo extus villosissimo..*12. S. discolor*

GG. Calyces 6–8 mm. longi, tubo extus appresso-villoso vel puberulo.

H. Folia ovata, crenata, subtus incano-tomentosa..*9. S. tomentosa*

HH. Folia elliptico-lanceolata, subintegra.

J. Pagina superiore sericea, inferiore tomentosa; margo revoluta..... *13. S. acutifolia*

JJ. Pagina superiore glabra, inferiore tomentella; margo plana..... *15. S. Pavoniana*

FF. Folia 2–15 mm. longa utrinque glabra (tomentella in *S. Andrei*) saepius subnitida, venis prominulis, ascendentibus, rectis, parallelis; margo leniter vel nihil revoluta.

G. Folia 5–15 mm. longa.

H. Folia glabra.

J. Calycis dentes subaristati, 2 mm. longi..... *17. S. glabrata*

JJ. Calycis dentes lanceolati, acuti, 1–1.5 mm. longi.
K. Folia utrinque acuta, internodiis multo longiora. ..... *18. S. tazifolia*
KK. Folia utrinque obtusa, internodiis subaequilonga. ..... *16. S. pallida*
HH. Folia praecipue subtus puberula..... *19. S. Andrei*
GG. Folia 2–5 mm. longa.
H. Folia in basi angustata, haud cordata.
J. Margo integra; calycis dentes erecti..... *20. S. striata*
JJ. Margo serratula; calycis dentes patentes.... *21. S. plicatula*
HH. Folia in basi cordata.
J. Corolla 18–20 mm. longa; calycis dentes tres postices omnino connati..... *23. S. connata*
JJ. Corolla 20–25 mm. longa; calycis dentes tres postices fere ad medium liberi..... *22. S. Jamesoni*
FFF. Folia 2–6 mm. longa, pubescentia, saepe sericea (pagina superiore glabra in *S. Lindeniana*), venis obscuris; margo saepius valde revoluta.
G. Calycis dentes duo antici subulati, fere aristati.
H. Dentes antici 3 mm. longi, posticos superantes. ..... *29. S. Lindeniana*
HH. Dentes antici 1.5 mm. longi, posticos aequantes. ..... *26. S. rigidula*
GG. Calycis dentes duo antici anguste lanceolati, nullomodo aristati, posticos vix aequantes vel breviores.
H. Folia linearia, utrinque sericeo-villosa; calyces 6 mm. longi..... *27. S. sericea*
HH. Folia ovata, pagina superiore glabrata vel puberula; calyces 5 mm. longi.
J. Foliorum margines valde revolutae; pagina inferiore tomentosa..... *28. S. revoluta*
JJ. Foliorum margines revolutae; pagina inferiore puberula, venis prominulis..... *24. S. argentea*

Sect. HESPEROTHYMUS Briq. in Engler u. Prantl, Nat. Pflanzenfam., ed. 1, IV. Abt. 3a, 300. 1897.

Micromeria sect. *Hesperothymus* Benth. Lab. Gen. et Sp. 371. 1834.

Herbae prostratae, caulibus repentibus, foliis ovato-rotundis, subglabris; floribus in foliorum axillis solitatim dispositis, pedicellis calyces maximam partem superantibus, rarius paulo brevioribus, bracteolis duobus nunc praesentibus nunc absentibus; calycibus tubulosis, dentibus erectis subaequalibus, obscure bilabiatis, intus hirsutis; corollae tubo paulo exserto.

This section seems to the present author to be most nearly

allied to sect. *Gardoquia* (*Ellipticae*) through *Satureia Douglasii* (Benth.) Briquet.

1. Satureia Brownei (Swartz) Briq. in Engler u. Prantl, Nat. Pflanzenfam., ed. 1, IV. Abt. 3a, 300. 1897.

Herba humilis, caule prostrato, repente, ramis filiformibus, ascendentibus, glabris vel tenuiter pilosis, quadratis, angulis acutis, submarginatis; foliis saepius tenuiter membranaceis minus quam internodiorum longitudine, saepius .5–1 cm. longis, rarius 1.5 cm., ovato-rotundatis, apice obtusioribus, in basi saepius subtruncatis et abrupte in petiolo angustatis, margine sinuato-crenata vel subintegra, omnino glabris vel subtus sparse sed patenter pilosis, petiolo gracillimo laminam aequante vel subnullo; floribus saepius solitariis, rarius duobus in axillis; calycibus glabris, rarius pilosis, 3–4 mm. longis, 13-venis, dentibus .8–1 mm. longis, subaequalibus, ovato-triangulis, acutis, ciliolatis, tubo intus ad dentium basim piloso-annulato, pedicello filiforme calyce aequilongo vel saepius longiore; corollis violaceis, fauce saepe variegatis, 4.5–5 mm. longis, tubo superne ampliato, intus glabro, labro 1 mm. longo, emarginato, labiolo longo 1.5 mm., lobo medio majore, patente, frequenter emarginato; staminibus didymis, supra tubi medium sitis, posticorum filamentis saepius 1 mm. longis, anticorum 2 mm., antheris .7 mm. latis, thecis paulo divergentibus; stylo e corolla subexserto; nuculis .8–1 mm. longis, oblongis, atris.

Subsp. **eubrownei** nom. nov.

Thymus Brownei Swartz, Prodr. Veg. Ind. Occ. 89. 1788, et Fl. Ind. Occ. 2: 1011. 1800; Benth. Lab. Gen. et Sp., 372. 1834.

Ramulis foliisque fere glabris; petiolis laminas aequantibus vel parte dimidia brevioribus; foliis nec sessilibus; florum pedicellis saepius calycibus aequilongis vel paulo brevioribus.

Specimens examined:

VENEZUELA: Galipán, 1250 m., June 7, 1885, *Jahn 201* (known as "Poleo") (US)[1]; Paramo de la Sal, 3000 m., Mérida, Sept. 1,

[1] The following abbreviations are used herein: ASP, Academy of Natural Sciences of Philadelphia; FM, Field Museum of Natural History; GH, Gray Herbarium; MBG, Missouri Botanical Garden; NY, New York Botanical Garden; UC, University of California; US, United States National Herbarium.

1921, *Jahn 569, 610* (US); between Antimano and Aguas Negros, 900–1500 m., Apr. 6–7, 1913, *Pittier 6017* (US); prope coloniam Tovar, 1854–5, *Fendler 869* (MBG; GH; NY); Paramo del Tambor, 2400 m., Mérida, Nov. 14, 1921, *Jahn 736, 738* (US); between Colonia Tovar and Lagonazo, in meadows and forests, 1700–2300 m., trailing, forming colonies on road, Feb. 21, 1921, *Pittier 9262* (US); Paramo del Jabón, 3000–3200 m., Oct. 2, 1910, *Jahn 41* (US); Paramo de Piñango, 2600 m., March, 17, 1915, *Jahn 410* (US).

Colombia: Sabana de Bogotá, *Bro. Ariste-Joseph A 903* (US); Cuestá de Tocotá, road from Buenaventura Cali, western Cordillera, 1500–1900 m., Dec. 1905, *Pittier 724* (US); grassy wayside, north of Caramanta, Antioquia, 2000–2200 m., repent herb with odor of *Hedeoma*, Sept. 19, 1922, *Pennell 10777* (US; ASP); forest, 2000–2500 m., Las Minitas, south of Caldás, Antioquia, Sept. 21–22, 1922, *Pennell 10941* (US; ASP); forest, 2000–2500 m., Huila, Aug. 1–8, 1917, *Rusby & Pennell 625* (US; MBG; GH; NY); meadow, 2000–2100 m., Balsillas, Huila, Aug. 3–6, 1917, *Rusby & Pennell 727* (US; MBG; GH; NY); forest, 2600–2900 m., Pinares above Salento, Caldas, Aug. 2–10, 1922, *Pennell 9243* (ASP; US); cliff near Rio San Andreas, 2500–2800 m., Caloguala, Coconuco, El Cauca, June 14, 18, 1922, *Pennell 7157* (US; ASP); Quaranda, July 8, 1876, *Andre 1016*, mountains southeast of Bogotá, 2800 m., June 6, 1875, *Andre 1016* (NY); Popayan, 1600–2000 m., *Lehmann B.T. 1141* (blooms in Feb.) (NY); grassy open, 1500–1600 m., Rio Quindio, Salento, Caldas, July 27–30, 1922, *Killip & Hazen 9040* (US; ASP); around Huila, Rio Paez Valley, El Cauca, 1600–1900 m., "a diminutive plant on wet sand and in moss; fl. purplish pink," Jan. 1906, *Pittier 1242* (US); wet slope, open forest, Susumoco, southeast of Quetamo, 1200–1400 m., Sept. 5, 1917, *Pennell 1735* (cor. violet) (NY); Popayan, *Hartweg 1335* (NY); moist soil near stream, 2000–2200 m., San Isidro, Puracé, El Cauca, June 10–11, 1922, *Pennell & Killip 6430* (US; ASP); field, 2000–2200 m., Santa Elena, above Santuario, Caldas, Sept. 7–13, 1922, *Pennell 10592* ("corolla pale amparo-purple with markings of violet-purple") (US; ASP); thicket below San Jose, 2300–2500 m., San Antonio, El Cauca, July 1, 1922, *Pennell 7654* (US; ASP).

ECUADOR: in Andibus Ecuadorensibus, 1857–9, *Spruce 5091* (GH); vic. of Huigra, Sept. 12, 1918, *Rose 22627* (known as "Poleo"; growing in water; strong odor of pennyroyal) (US).

Sect. GARDOQUIA Briq. in Engler u. Prantl, Nat. Pflanzenfam., ed. 1, IV. Abt. 3a, 300. 1897.

Gardoquia Ruiz et Pavon, Prodr. 86. *pl. 17.* 1794.

Frutices fruticulive ramulis saepius ascendentibus, brevioribus; foliis saepe fasciculatis, forma diversioribus, maximam partem subintegris, glabris vel pubescentibus; floribus 1–6 in foliorum axillis, pedicellis singulis bracteolis duobus ornatis (*S. multiflora* exclusa) quam calycibus brevioribus elatis; calycibus tubulosis, cylindratis, dentibus maximam partem bilabiatis, tribus posticis anticos superantibus, acutis, etiam subaristatis, intus nudis vel hirsutis, saepius erectis; corollae tubo maximam partem calycem duplo triplove superante.

Gardoquia merges into *Xenopoma* imperceptibly in habit, as illustrated by *S. breviflora* and *S. tomentosa* or *S. boliviana* and *S. Gilliesii*, and in floral characters, as in *S. rigidula*, *breviflora*, *argentea*, *boliviana* and *vana*. The closest alliance between the two sections appears to lie between *S. boliviana* and members of the subsection *Obovatae*, or between *S. breviflora*, *tomentosa* and *vana*.

A. *Ellipticae*

Foliis 2–5 cm. longis, sat tenuibus, ovalibus vel ellipticis, glabris vel subglabris, crenatis; floribus 3–15 in cymulis in foliorum axillis, corollis 3–3.5 cm. longis.

2. Satureia multiflora Briq. in Engler u. Prantl, Nat. Pflanzenfam., ed. 1, IV. Abt. 3a, 300. 1897.

Gardoquia multiflora Ruiz et Pav. Syst. Veg. 149. 1798; Benth. Lab. Gen. et Sp., 398. 1834, et in DC. Prodr. **12**: 235. 1848.

Rizoa ovatifolia Cav. Anal. Cienc. Nat. **3**: 133. 1801.

Frutex aromaticus erectus, ramis altitudine circa 1 m., ramulisque subglabris, purpureis, quadratis, angulis obtusis, internodiis quam foliis sat longioribus, ramulis lateralibus brevibus, gracilibus; foliis membranaceis, 3–5 cm. longis, 1–2 cm. latis, lanceolatis vel ovatis, apice obtusis, in basi rotundatis, margine

convexa, leniter crenata, crenarum culminibus inter se 4–5 mm. distantibus, petiolis gracilibus, 5–12 mm. longis, glabris; floribus 3–7–15 in cymis laxis, raro solitariis, pedunculis gracillimis .5–1.5 cm. longis elevatis, bracteolis parvis 1–1.5 mm. longis subulatis ornatis, pedunculis secondariis .3–1 cm. longis; calycibus membranaceis, 8 mm. longis, in basi paulo angustatis, extus glabris, fauce intus nudis; dentibus circa 1 mm. longis, lanceolatis, acutissimis, subaequalibus, duobus anticis tamen paulo longioribus approximatisque; corollis ut videtur purpureis, 20–30 mm. longis, maximam partem circa 25 mm., tubo extra calycem multo dilato, extus puberulis vel subglabris, intus pilosis, labro longo circa 4 mm., retuso, labiolo aequilongo lobis rotundatis medio lateralibus paulo longiore, in basi angusto; staminibus didymis, paulo supra tubi medium sitis, anticis corolla longioribus, posticis labro subaequilongis, thecis late divergentibus, .7–.8 mm. longis; stylo paulo exserto; nuculis oblongis, fuscis, 1.2 mm. longis.

Specimens examined:

CHILI: *unknown collector 245* (NY); 1828–34, *Gay 148* (NY); *Gay* (GH); Chanco, *Reed* (GH); Valdivia, Ufergebüsch des Calle-Calle, Jan. 17, 1898, *Buchtien* (US); Chiquayante (?Chiguailante), Feb. 19, 1892, *Kuntze* (US); Budi, Jan. 1923, *Bro. Claude-Joseph 2016* (US); Temuco, Jan. 1920, *Bro. Claude-Joseph 1043* (US); bushy slopes above Aranco, 50–100 m., March 6, 1925, *Pennell 12953* (GH).

ARGENTINA: Panguipulli, July 1924, *Bro. Claude-Joseph 2627* (US).

3. **Satureia elliptica** Briq. in Engler u. Prantl, Nat. Pflanzenfam., ed. 1, IV. Abt. 3a, 300. 1897.

Gardoquia elliptica Ruiz et Pavon, Syst. Veg. 149. 1798; Benth. Lab. Gen. et Sp. 399. 1834; et in DC. Prodr. 12: 235. 1848.

Stachys speciosa Hook. Bot. Misc. 2: 235. 1831.

Frutex erectus odoratissimus, ramosus, ramis teretibus cortice discedente, ramulis glabratis, nitidis, quadratis, angulis acutis; internodiis plerumque foliis aequantibus vel longioribus; foliis 20–30 mm. longis, 10–15 mm. latis, ellipticis, apice obtusis, in basi acutiusculis et ad petiolum 3 mm. longum angustatis,

membranaceis, planis, rugosis, margine supra medium breviter serrata, utrinque glabris vel sparse ciliatis, subtus pallidiore, venis prominentioribus; floribus 4–12 in axillis, pedunculis brevissimis elatis, bracteolis linearibus, quam pedicellis brevioribus ornatis; calycibus 8–11 mm. longis, extus villosis, fauce intus nudis, dentibus duobus anticis fere 3 mm. longis, lanceolato-acuminatis, approximatis, tribus posticis connatis, circa 1 mm. longis; pedicellis 3–5 mm. longis, villosis; corollis coccineis, interdum flavis, 35–40 mm. longis, extus hirtellis, tubo extra calycem multo dilato, intus ad basim hirsuto, labro 4.5–5.5 mm. longo, leniter emarginato, ovato, labiolo subaequilongo, lobo medio lateralibus paulo longiore; staminibus supra tubi medium insertis, didymis, anticis labro longioribus, posticis aequilongis, thecis late divergentibus, 1 mm. longis; stylo e corolla 10 mm. exserto, ramis 1 mm. longis, planis, acutis; nuculis 2 mm. longis, oblongo-obovatis.

Specimens examined:

PERU: Obrajillo, *Wilkes Exp.* (US); rock ledges at cascades of Rio Chillon, above Obrajillo, Lima, 3100–3300 m., June 13–23, 1925, *Pennell 14401* (GH); abundant on open rocky slopes, Huaros, Lima, 3200–3600 m., June 23, 1925, *Pennell 14734* (GH).

4. Satureia Loesneriana Mansfeld in Bot. Gart. Berlin-Dahlem, Notizbl. 9: 287. 1925.

"Frutex 1 m. altus. Rami juniores quandrangulares, brevissime puberuli. Foliorum lamina 9–22 mm. longa, 3–8 mm. lata, elliptica vel rarius oblonga vel obovata, apice acuta, brevissime mucronulata, basi in petiolum brevissimum angustata, margine ± remote et breviter dentata vel integra, subrevoluta vel plana, penninervis, utrinque glanduloso-punctata, nervis utrinque prominulis (vel supra vix conspicuis), initio utrinque breviter puberula, postea praecipue supra glabrescens vel glabra. Verticillastri usque 16-flori. Calyx circ. 5.5 mm. longus, bilabiatus, labio tridentato dentibus 0.6 mm. longis, labiolo dentibus 1.5 mm. longis, dentibus extus et intus brevissime puberulus. Corolla circ. 15 mm. longa, labio sat profunde emarginato 2.5 mm. longo, labiolo tripartito 3 mm. longo, extus pubescens, tubo intus antice piloso. Stamina didynamia ± exserta, filamenta antica 5, postica 3.5 mm. longa, antheris divergentibus. Stylus exsertus.

"Peru: Prov. Huamachuco, Depart. Libertad, über Huamachuco, Grassteppe mit eingestreuten immer oder regengrünen Straüchern, 3400–3500 m. ü. M., 1 m. hoher Strauch, Blüten violett (Fl. 3. VII. 1914.—WEBERBAUER n. 7008!).

"Die Art gehört in die Nähe von *S. elliptica* (Ruiz et Pav.) Briq. und *S. Matthewsii* Briq., die erstere Art weicht schon durch eine viel längere Korolla ab, die letztere besitzt nach der Beschreibung eine längere, innen kahle Krone und kürzere Kelchzähne."

Mihi ignota; ad *S. ellipticam* affinis videtur. Inquire praeterea in *S. rugosani* Briq. in Engler u. Prantl. Nat. Pflanzenfam., ed. 1, IV. Abt. 3a, 300. 1897.

B. *Obovatae*

Foliis saepius 1–1.5 cm. longis, obovatis vel oblanceolatis, glabris vel pubescentibus, margine integra vel crenata; floribus 1–6 in verticillastris sat densis in foliorum axillis, corollis circa 2–2.5 cm. longis (6 mm. in *S. breviflora*).

5. Satureia Gilliesii Briq. in Engler u. Prantl, Nat. Pflanzenfam., ed. 1, IV. Abt. 3a, 300. 1897.

Gardoquia Gilliesii Grah. in Edinb. Phil. Jour. **1831**: 377. Sept. 1831; Benth. in DC. Prodr. **12**: 235. 1848.

G. chilensis Benth. in Hook. and Arn. Bot. Beechey's Voyage, 58. 1841.

Satureia chilensis Briq. in Ann. Conserv. et Jard. Bot. Genève **2**: 191. 1898.

Fruticulis suaveolens altitudine ad 1–1.5 m., caulibus in basi lignosis, procumbentibus, ramis teretibus, cortice discedente, ramulis pubescentibus, quadratis, angulis obtusis, internodiis ramulorum sterilium quam foliis brevioribus, his itaque densis, eis fertilium sat distantibus; foliis 7–10 mm. longis, rarius 10–20 mm., anguste oblanceolatis apice rotundatis, in basi ad petiolum brevem attenuatis, margine integra, revoluta, utrinque subglabris, rarius patenter puberulis; floribus 3–7 saepius circa 5 in axillis, pedunculis .5–2 mm. longis, bracteolis foliis conformalibus minoribus; calycibus 7–12 mm. longis, in basi paulo angustatis, extus saepius puberulis, fauce intus nudis, dentibus 2–3 mm. longis, lanceolato-acuminatis, subaristatis, duobus anticis quam

posticis tribus saepe longioribus approximatisque; corollis circa 12–18 mm. longis, coccineis, extus pubescentibus, tubo ampliato, intus pilosis, labro longo 2–3 mm., emarginato, sinu .5 mm. profundo, labiolo paulo longiore, lobo medio lateralibus superante, in basi angustato; staminibus didymis, supra tubi medium sitis, posticis vix e tubo exsertis, anticis corolla aequilongis, thecis late divergentibus, .5 mm. longis; stylo paulo exserto; nuculis non visis.

Specimens examined:

PERU: *Dombey 291* (GH).

CHILI: Valparaiso, June 1885, *Rusby 1061* (GH); Valparaiso, July 1851, *Gillies* (GH); Valparaiso, Apr.–July, 1856, *Harvey* (GH); ex regione inferiori Andium Chilensium juxta tepidaria Cauquenes, 3000–5000 m., May 14–17, 1882, *Ball* (GH; NY); Maule, *Reed* (GH); Valparaiso, *Arnott* (NY); no locality, 1884–85, *Statin* (NY); no data, *Wilkes Exp.* (ASP; US; NY); Santiago, montaña, Dec. 5, 1920, *Bro. Claude-Joseph 1321* (US); Valparaiso, *Eights* (US); Valparaiso, in Gebüschen, Sept. 5, 1895, *Buchtien* (US); Isle of St. Marys, *Eights* (US); mountains east of Santiago, 769 m., Dec. 27, 1900, *Hastings 310* (US; NY; UC); Santiago, Jan. 1919, *Bro. Claude-Joseph 840* (US); Valparaiso, Feb. 1922, *Bro. Claude-Joseph 1619* (US); Rio Blanco, Jan. 1924, *Bro. Claude-Joseph 2479* (US); Valparaiso, *Mertens* (MBG); Santiago, Jan. 1920, *Bro. Claude-Joseph 956* (US); near Valparaiso, June 1885, *Rusby 1061* (ASP; US); no data, *Styles* (ASP); in fruticetis apricis collium St. Jago, Quillota, Feb., 1829, Sept.–Oct., 1829, *Bertero 291, 1015* (MBG; GH; NY); Prov. Curicó, hacienda Monte Grande, 1000 m., Dec., 1924, *Werderman 547* (UC); Cerro Echaurrina (San Fernando), Prov. Colchagua, Oct., 1925, *Montero 13* (GH).

6. Satureia Matthewsii Briq. in Ann. Conserv. et Jard. Bot. Genève. **2**: 189. 1898.

Frutex ut videtur elatus, ramis ascendentibus, teretibus, glabris, mox ligneis, ramulis gracilibus, glabris, nodis inter se 3–5 mm. vel in ramulis sterilibus 1–1.5 cm. distantibus; foliis 1–1.5 cm. longis, elliptico- vel rhomboideo-obovatis, frequenter subrotundatis, apice saepius obtusis, in basi rotundato-extenuatis,

utrinque glabris, dense glanduloso-punctatis, margine integra, revoluta; verticillastris 1–3 floribus, in foliorum ad ramulorum apices axillis approximatis, bracteis lineari-spatulatis, quam pedicellis paulo longioribus; calycibus fere 1 cm. longis, anguste tubulosis, extus puberulis, fauce intus nudis, patenter bilabiatis, labia superiore erecta, 3 mm. longa, dentibus subulatis ad medium connatis, inferiore 2.5 mm. longa, dentibus patentibus, subulatis, ad basim connatis, pedicellis 2 mm. longis elatis; corollis circa 2 cm. longis, tubo 18 mm. longo, intus subnudo, extus hirtello, superne ampliato, labro 3 mm. longo, emarginato, labiolo paulo longiore, lobo medio majore; staminibus supra tubi medium sitis, didymis, breviter exsertis, thecis valde divergentibus; stylo 5–6 mm. longo, exserto; nuculis non visis.

Specimens examined:

Peru: Near San Felipe, Cajamarca, 1950 m., May, 1915, *Weberbauer 7109* (FM).

7. **Satureia guamaniensis** Mansfeld in Bot. Gart. Berlin-Dahlem Notizbl. **9**: 286. 1925.

S. obovata Briq. in Engler u. Prantl, Die Nat. Pflanzenfam., ed. 1, IV. 3a, 300. 1897, non Lag. Gen. et Sp. Nov. 18. 1816.

Gardoquia obovata Ruiz et Pavon, Syst. Veg. 150. 1798; Benth. Lab. Gen. et Sp., 403. 1834, et in D.C. Prodr. **12**: 236. 1848.

Frutex altitudine circa 1 m., ramis teretibus, ramulis quadratis, pubescentibus glabratisve, nodis approximatis; foliis 5–7 mm. longis, obovatis oblanceolatisve, in basi ad petiolum brevissimum angustatis, utrinque glabris, subtus pallidioribus; margine integra, revoluta; floribus in axillis solitariis, bracteolis foliis conformalibus, quam pedicellis longioribus; calycibus 5–6 mm. longis, extus glabratis, fauce intus hirsutis, dentibus subaequalibus, lanceolatis, acutiusculis, labia postica tamen longiore, ore itaque obliquo, pedicellis 2 mm. longis elatis; corollis coccineis, 22–24 mm. longis, tubo extra calycem valde dilato, fauce diametro 8 mm., extus pubescentes, intus leniter piloso, labro 5 mm. longo, emarginato, sinu 1 mm. profundo, labiolo aequilongo, lobis aequalibus; staminibus paulo supra tubi medium sitis, didymis, anticis e corolla 5–6 mm. exsertis, posticis e tubo exsertis; thecis late divaricatis, .6 mm. longis; stylo e corolla 8 mm. exserto; nuculis non visis.

S. guamaniensis, as suggested by its author,[1] is scarcely separable from *Gardoquia obovata* R. & P.

Specimens examined:

PERU: between Cuancabamba and Oyavaca, 3200 m., May, 1912, *Weberbauer 6323* (FM, type collection of *S. guamaniensis* Mansf).

8. Satureia breviflora Briq. in Engler u. Prantl, Die Nat. Pflanzenfam., ed. 1, IV. Abt. 3a, 300. 1897.

Gardoquia breviflora Benth. Lab. Gen. et Sp. 401. 1834, et in DC. Prodr. **12**: 237. 1848.

Frutex ramulis quadratis, pubescentibus, angulis obtusis, internodiis saepius folia superantibus; foliis .5–1 cm. longis, rotundatis vel rotundato-ovatis, obtusis, subsessilibus, pagina superiore viride, puberula, venis impressis, inferiore cano-tomentosa venis prominenter costatis, margine subintegra vel frequenter dentato-crenata, crenis fere 1 mm. altis; floribus 3–6 in axillis, brevissime pedunculatis, verticillastris saepius ad ramulorum brevium lateralium extremitates congestis, foliis floralibus calyces subaequantibus, bracteolis linearibus 1–2 mm. longis; calycibus 3.5–4 mm. longis, extus hirtellis, fauce intus nudis, dentibus 1–1.5 mm. longis, anguste lanceolatis, acutissimis, duobus anticis quam posticis paulo longioribus, pedicellis gracilibus circa 1 mm. longis; corollis 6–7 mm. longis, tubo intus ad staminum anticorum bases piloso, labro 1 mm. longo, emarginato, labioli lobis subaequalibus, fere 2 mm. longis, medio paulo majore; staminibus in fauce sitis, didymis, vix e tubo exsertis, thecis paulo divergentibus; stylo e tubo paulo exserto; nuculis non visis.

Specimens examined:

ECUADOR: Quitensian Andes, *Jameson* (US).

C. *Discolores*

Foliis saepius 1–2 cm. longis, lanceolatis vel elliptici-lanceolatis, pagina superiore glabra, sericea vel villosula, inferiore cano-tomentosa vel tomentella, margine saepius integra (crenata in

[1] "Die am nächsten stehende Art *S. obovata* (Ruiz et Pav.) Briq. unterscheidet sich nach der (nicht mehr ausreichenden) Beschreibung nur durch längere Blätter, grau behaarte zweige an der Basis behaarte kelch und innen Kahle Krone."—Mansfeld, *l.c.*

S. tomentosa); floribus 1–6 in verticillastris sat densis in foliorum axillis; corollis 1.5–3 cm. longis.

9. Satureia tomentosa Briq. in Engler u. Prantl, Die Nat. Pflanzenfam., ed. 1, IV. Abt. 3a, 300. 1897.

Gardoquia tomentosa Kunth in Humboldt et Bonpland, Nov. Gen. et Sp. **2**: 314. 1817; Benth. in DC. Prodr. **12**: 237. 1848.

Frutex ramosus altitudine ad 1 m., ramis duris, ascendentibus, subteretibus, cortice saepe discedente, internodiis saepius 2–3 cm. longis, ramulis gracilibus, ascendentibus, quadratis, angulis obtusis, superne cano-puberulis vel tomentosis, internodiis maximam partem quam foliis brevioribus; foliis 1–1.5 cm. longis, saepius ovatis, frequenter rotundatis vel ellipticis, apice acutis vel obtusis, in basi cuneato-angustatis, margine revoluta, saepius obscure crenata, pagina superior rugosa, nunc glabra nunc hirtella, inferiore albo-tomentosa, rarius villosa, venis subtus prominentioribus, petiolis 1–2 mm. longis elatis; verticillastris saepius 3–6-floribus, rarius breviter pedunculatis, in axillis foliorum superiorum dispositis, his calyces paulo superantibus; calycibus 7 mm. longis, extus molliter appresso-villosis, sub-bilabiatis, labia superiore longiore, dentibus supra medium connatis, vix .5 mm. longis, triangulo-lanceolatis, inferiore 2 mm. longa, dentibus liberis, lanceolato-subulatis, approximatis; pedicellis 2 mm. longis elatis; corollis rubris, 2–3 cm. longis, extus pubescentibus, tubo superne gradatim ampliato, intus tenuiter piloso, labro subrecto 5 mm. longo, emarginato, labiolo subaequilongo, lobo medio lateralibus nunc aequilongo nunc fere duplo longiore; staminibus breviter exsertis, didymis, supra tubo medium sitis, thecis divergentibus; stylo exserto, circa 5 mm. longo; nuculis atris, oblongis, angustis, 1.5 mm. longis.

A species of some variability in habit and pubescence and to which *S. Kunthii* (*grandiflora*), *elegans*, and *pulchella* may apparently be referred. Considering the variability of the species as shown by the fairly large series of specimens examined, there is nothing in Kunth's descriptions to permit of their differentiation.

Specimens examined:

?COLOMBIA: Tobacumdo, June 9, 1876, *Andre 3598* (NY); no data, *Andre K 460* (NY).

ECUADOR: Banos, Prov. Tunguragua, 2000 m., *Tate 607* (US); ad sepes, in planitie Rumibamba, Quito, *Hartweg 1340* (NY); ad pontem Guapalo prope Quito *Hartweg 1339* (NY); Punin, Quebrada Chalan, 2779 m., Oct. 28–Nov. 4, 1923, *Anthony & Tate 423* (US); ad vicum Guapalo prope Quito, 2076 m., *Jameson 659* (ASP); no data, *Jameson* (US); Quitensian Andes, 1855, *Couthouy* (GH); Riobamba, Aug. 11, 1920, *Holway 870* (US; GH); bei Riobamba, Ambato, Gualabamba, 1800–2700 m., Nov. 25, 1880, *Lehmann 149* (US).

PERU: thickets and stream banks, 15 mi. southeast of Huanuco, 3230 m., May 31–June 3, 1922, *Macbride & Featherstone 2084* (forma villosa) (MBG; FM).

10. Satureia thymoides Briq. in Engler u. Prantl, Nat. Pflanzenfam., ed. 1, IV. Abt. 3a, 300. 1897.

Gardoquia thymoides Kunth in Humboldt et Bonpland, Nov. Gen. et Sp. Pl. **2:** 314. 1817; et Benth. in DC. Prodr. **12:** 238. 1848.

"Frutex ramosissimus; ramis tetragonis, pubescentibus. Folia opposita, brevissime petiolata, ovata, subcordata, acuta, subserrata, margine revoluta, venosa, supra glabriuscula, subtus cano-pubescentia, tres lineas longa, duas lineas lata. Petioli pubescentes. Flores verticillati, pedunculati, semipollicares; verticillis multifloris, distantibus; internodiis quinque aut novem lineas longis. Calyx tubulosus, decemsulcatus, quinque-dentatus, pubescens; dentibus inaequalibus, acuminato-subulatis. Corolla calyce triplo longior, flava (?) ex Bonpl., pubescens; tubo interne pubescente; fauce longissima, inferne barbata; limbo bilabiato, purpureo-maculato; labio superiore emarginato; inferiore trifido; laciniis obtusis. Stamina quatuor, didynama, distantia, subinclusa. Filamenta glabra. Antherae arcuatae. Stylus exsertus, glaber. Stigma bifidum. Fructus ignotus. Crescit in Andibus Quitensibus?"

Ut videtur ad *Discolores* referenda et ab affinibus imprimis foliis subsessilibus, ovatis, subcordatis, parvis (3 lin. longis) separanda est.

11. Satureia foliolosa Briq. in Engler u. Prantl, Nat. Pflanzenfam., ed. 1, IV. Abt. 3a, 300. 1897.

Gardoquia foliolosa Benth. in DC. Prodr. **12:** 238. 1848.

"foliis parvis subsessilibus ovatis obtusis integerrimis supra pallidis puberulis glabratisve subtus canescenti-tomentellis, verticillastris 2–6-floris, calyce subsessili hirsutissimo dentibus acutissimis patentibus tubo suo vix brevioribus. Ad Chapada de Santa Martha (Purdie!). Frutex decumbens, ramosissimus, dense foliosus. Rami nunc pilis longis hirsutissimis, nunc fere glabri. Folia 2–3 lin. longa, floralia conformia. Calyces 2 lin. longi, latiuscule campanulati, incurvi. Corolla villosa, semipollicaris? ei *G. discoloris* similis videtur, sed in specimine nondum aperta (v.s.)."

Planta mihi ignota similis *S. discolori* est, tamen ut videtur foliis ovatis, subsessilibus, minoribus (2-3 lin. longis) et ramis nunc fere glabris, nunc densissime pilis longis ornatis imprimis differt.

12. Satureia discolor Briq. in Engler u. Prantl, Nat. Pflanzenfam., ed. 1, IV. Abt. 3a, 300. 1897.

Gardoquia discolor Kunth in Humboldt et Bonpland, Nov. Gen. et Sp. Pl. **2:** 312. 1817; Benth. in DC. Prodr. **12:** 238. 1848.

Frutex ramosissimus, ramis teretibus, duris, cortice discedente, ramulis quadratis, puberulis, nodis approximatis; foliis densis, membranaceis, 5–10 mm. longis, maximam partem anguste ellipticis, rarius lanceolatis vel oblanceolatis apice acutiusculis, in basi ad petiolum brevem angustatis, margine integra, revoluta, pagina superiore subglabra nec nitida, inferiore patenter pallidiore, albo-tomentella, venis prominentioribus; floribus in axillis solitariis, bracteolis foliosis sed minoribus; calycibus 4.5–5 mm. longis, extus piloso-villosis, fauce intus subglabris, dentibus tubum aequantibus, lanceolato-acuminatis, approximatis, tribus posticis connatis, lanceolatis, acutis, 1.5 mm. longis, omnibus pubescentibus, vix villosis, pedicellis gracilibus, 2 mm. longis, corollis purpureis (Bonpland), 14–15 mm. longis, extus villosulis, tubo extra calycem dilato, intus ad faucem piloso; labro fere 2 mm. longo, emarginato, sinu .5 mm. profundo, labiolo aequilongo, lobis subaequalibus; staminibus didymis supra tubi medium sitis, anticis longioribus, omnibus inclusis, thecis divergentibus, .6 mm. longis; stylo e corolla vix exserto; nuculis non visis.

Specimens examined:

VENEZUELA: prope coloniam Tovar, 1854–5, *Fendler 2058*

(MBG; GH); Silla de Caracas, 2600 m., Apr. 27, 1884, *Jahn 288* (US); Silla de Caracas, 2000–2640 m., Dec. 26–29, 1918, *Pittier 8360* (US); Silla de Caracas, 2461 m., May 21, 1874, *Kuntze 1640* (1–3 ft. tall; fl. violet) (US; NY).

13. Satureia acutifolia Briq. in Engler u. Prantl, Die Nat. Pflanzenfam., ed. 1, IV. Abt. 3a, 300. 1897.

Gardoquia acutifolia Benth. in DC. Prodr. **12**: 236. 1848.

Frutex ut videtur, ramulis quadratis, sericeo-villosis, ad extremitates albis, mox fuscis, ramorum internodiis foliorum longitudine subaequilongis, sed foliis ramulorum fertilium (vel ? juvenilium) fasciculatis; foliis 1.5–3 cm. longis, elliptico-lanceolatis, utrinque acutis vel in basi angustatis, margine patenter revoluta, integra, pagina superiore sericeo-villosa, inferiore albotomentosa, petiolis 1–2 mm. longis elatis; floribus tribus in axillis, bracteolis 2–3 mm. longis subtentis, calycibus 8 mm. longis, extus sericeis, 13-venis, labiis 2 mm. longis, dentibus duobus anticis anguste lanceolatis, acuminatis, liberis, tribus posticis supra medium connatis; pedicellis 1–2 mm. longis elatis; corollis ut videtur rubris, 2.5 (?–3.0) cm. longis, extus sparse villosis, tubo superne gradatim ampliato, labro erecto, fere 5 mm. longo, labiolo subaequilongo; staminibus ut videtur inclusis, stylo paulo exserto; nuculis non visis.

Specimens examined:

PERU: *? Matthews* (NY).

14. Satureia mantaroensis Mansfeld in Bot. Gart. Berlin-Dahlem, Notizbl. **9**: 287. 1925

"Frutex usque 2 m. altus. Rami juniores quandrangulares, dense puberuli. Foliorum lamina 7–14 mm. longa, 5–7 mm. lata, elliptica vel subobovata vel oblonga, supra brevissime puberula subtus pallidior, tomentella, plana, nervis utrinque prominulis, apice acuta vel obtusa, basi angustata, margine integerrima vel vix conspicue et remote dentata; petiolus circ. 2 mm. longus, tomentellus. Verticillastri plerumque biflori, foliis floralibus conformibus. Pedicelli circ. 2 mm. longi, cano-puberuli. Calyx 8 mm. longus extus cano-puberulus, dentibus intus breviter pilosis, bilabiatus (3/2), dentes labii circ. usque ad medium con-

nati, dentes labioli paullo breviores, liberi. Corolla 20–23 mm. longa (labio emarginato circ. 5 mm. longo, labiolo trilobato 4.5 mm. longo), extus dense pubescens, intus tubo antice piloso et paulo supra basin annulo pilorum vestita. Stamina didynamia, anticis longioribus circ. 9 mm. longis, posticis 4–5 mm. longis, antheris divergentibus, anticis et stylo exsertis. Stylus 32 mm. longus.

"Peru: Depart. und Prov. Huancavelica, südliche Talwand des Mantaro über Iscuchaca, Grassteppe mit eingestreuten Sträuchern, 3600 m.u.M., bis 2 m. hoher Strauch mit roten Blüten (Fl. 15. VI. 1910.—WEBERBAUER n. 5677!).

"Die Art steht nach der Länge der Krone zwischen *S. Pavoniana* Briq. (*Gardoquia incana* Ruiz et Pav.) und *S. discolor* (Kunth) Briq. in der Mitte; *S. discolor* hat ferner eingeschlossene Stamina und inne kahle Kronröhre, *S. Pavoniana* oberseits bleiche Blätter (nach der nicht mehr ausreichenden Beschreibung). *S. thymoides* (Kunth) Briq. weicht durch den fast herzförmigen Blattgrund und zurückgerollten deutlich gezähnten Blattrand ab, steht aber sonst besonders im Blütenbau der *S. mantaroënsis* wohl am nächsten."

Ex descriptione ab *S. Pavoniana* vix distincta videtur.

15. Satureia Pavoniana Briq. in Ann. Conserv. et Jard. Bot. Genève **2**: 189. 1898.

Gardoquia incana Ruiz et Pavon, Syst. Veg. 150. 1798; Benth. Lab. Gen. et Sp., 401. 1834, et in DC. Prodr. **12**: 237. 1848.

Frutex altitudine 30 cm.–2 m., caulibus erectis vel ascendentibus, lignosis, subteretibus, cortice discedente, internodiis saepius 3–4 cm. longis, ramulis saepius 5–10 cm. longis, gracilibus, canescentibus, ascendentibus, internodiis quam foliis saepius brevioribus; foliis 1–1.5 cm. longis, ellipticis, rarius ovatis, acutis, in basi angustatis, margine maximam partem integra planaque, rarius denticulata vel subrevoluta, pagina superiore pallidiore, non rugosa sed venis tamen saepe prominentioribus, inferiore dense cano-tomentella, petiolis 1–2 mm. longis, verticillastris 1–3-floribus, decussatim instructis in foliorum superiorum axillis dispositis, his calyces paulo superantibus, bracteolis linearibus ornatis; calycibus incanis, paulo arcuatis, 6–8 mm. longis, subbi-

labiatis, fauce intus subnudis, labiis circa 1.5 mm. longis, dentibus lanceolato-subulatis, posticis tribus ad medium connatis, anticis fere liberis brevioribus, pedicellis 2–3 mm. longis elatis; corollis rubris, fere 3 cm. longis, arcuatis, extus pubescentibus, tubo superne gradatim ampliato intus infra staminum praecipue anticorum bases piloso, labro subrecto, 5 mm. longo, emarginato, labiolo subaequilongo, lobo medio longiore; staminibus didymis, omnibus breviter exsertis supra tubi medium sitis; stylo circa 5 mm. exserto; nuculis circa 1.5 mm. longis, oblongis, angustis, atris.

Specimens examined:

PERU: Yanahuanca, densely shrubby northeastern slope, 3076 m., June 16–22, 1922, *Macbride & Featherstone 1196* (FM; MBG); sunny blackberry patch, Mito, 2769 m., July 8–22, 1922, *Macbride & Featherstone 1411* (FM; MBG); dry hills, Oroya, Lima, 3076–3384 m., 1919, *Kalenborn 82* (US; MBG); no data, *Dombey* (GH).

D. *Striatae*

Foliis 2–15 mm. longis, forma diversis, utrinque glabris, saepius subnitidis, venis prominulis, ascendentibus, rectis, parallelis, margine subintegra, floribus solitariis vel tribus in foliorum axillis; corollis 1.5–3 cm. longis.

16. Satureia pallida sp. nov.

Frutex ramosus, altitudine ut videtur circa 1 m., ramis ascendentibus, teretibus, lignosis, cortice discedente, ramulis divaricatis, glabris, quadratis, angulis acutis, internodiis foliis subaequilongis vel brevioribus; foliis 1–1.5 cm. longis, maximam partem ovalibus vel elliptico-oblongis, obtusis, in basi saepius rotundatis, utrinque glabris et pallidioribus, margine leniter revoluta, integra, petiolis 1–2 mm. longis elatis; floribus 1–3 in foliorum supremorum axillis dispositis; calycibus in speciminibus visis 8–9 mm. longis, puberulis, subbilabiatis, fauce intus nudis, labiis fere 1.5 mm. longis, dentibus posticis tribus ad medium connatis, anticis liberis, omnibus subulatis, acutiusculis, pedicellis 3–4 mm. longis, bracteolis linearibus ad medium ornatis elatis; corollis 2.5 cm. vel ultra longis, arcuatis, extus pubescentibus, tubo superne gradatim dilato, intus infra staminum praecipue

anticorum bases piloso, labro subrecto, 4 mm. longo, emarginato, labiolo subaequilongo, lobo medio longiore; staminibus didymis, omnibus breviter exsertis, supra tubi medium sitis; stylo exserto; nuculis circa 1.5 mm. longis, ellipticis, atris.

A species allied to *S. Pavoniana* and at first thought to be a glabrous variety of it. However, study of other members of the type collection, together with an unnumbered collection by Bang at the New York Botanical Garden which is apparently conspecific, suggests a range of leaf variation too great to permit of reference to *S. Pavoniana*. The flowers of the two species are very similar, differing chiefly in the size of the calyces and in the more acute, even acuminate, calyx teeth of *S. pallida*. The species is intermediate with the groups *Discolores* and *Striatae*.

Specimens examined:

BOLIVIA: *Bang*, no data (NY); Turedon, Bolivian plateau, 1891, *Bang 1127* (US; NY, TYPE; GH).

17. Satureia glabrata Briq. in Engler u. Prantl, Die Nat. Pflanzenfam., ed. 1, IV. Abt. 3a, 300. 1897.

Gardoquia glabrata Kunth in Humboldt et Bonpland, Nov. Gen. et Sp. Pl. **2:** 313. 1817; Benth. in DC. Prodr. **12:** 236. 1848.

Frutex ramosissimus, ramis teretibus, cortice discedente, ramulis densis quadratis patenter pubescentibus; foliis confertis, 6–9 mm. longis, ellipticis vel elliptico-lanceolatis utrinque acutiusculis, subsessilibus, utrinque glabris, pagina superiore nitida, inferiore pallidiore, punctata, venis prominentibus, margine subintegra, vix revoluta; floribus tribus in axillis, rarius solitariis pedunculis subnullis, bracteolis primis omnino foliosis, secundariis conformalibus, minoribus ornatis; calycibus 7 mm. longis, extus glabris, fauce intus leniter hirsutis, dentibus subaequalibus, fere 3 mm. longis, longe acuminatis, ore obliquo, pedicellis 2–2.5 mm. longis; corollis 27 mm. longis, extus pubescentibus, intus glabris, labro 7 mm. longo, emarginato, sinu 1 mm. profundo, labiolo paulo breviore, lobo medio lateralibus subduplo longiore; staminibus didymis, supra tubi medium sitis, posticis labro paulo brevioribus, anticis corollam superantibus; thecis late divergentibus, .7–.8 mm. longis; stylo e corolla 7–8 mm. exsertis; nuculis non visis.

Specimens examined:

ECUADOR: vic. of Tablón de Oña, Sept. 27, 1918, *Rose 23083* (US).

18. Satureia taxifolia Briq. in Engler u. Prantl, Nat. Pflanzenfam., ed. 1, IV. Abt. 3a, 300. 1897.

Gardoquia taxifolia Kunth in Humboldt et Bonpland, Nov. Gen. et Sp. Pl. **2**: 312. 1817; Benth. in DC. Prodr. **12**: 236. 1848.

Thymus taxifolius Willd. ex Benth. in Linnaea **11**: 342. 1837.

Frutex ramosissimus altitudine 1–2 m., ramis teretibus, cortice discedente, ramulis densis, quadratis, puberulis; foliis densis, ad ramorum extremitates saepius imbricatis, maximam partem 10–12 mm. longis, saepius lanceolato-oblongis, frequente oblanceolatis etiam lineari-oblongis, apice obtusis, rarius acutiusculis, in basi ad petiolum brevissimum angustatis, utrinque glabris, pagina superiore nitida, inferiore pallidiore, venis prominentibus, margine revoluta, integra vel praecipue ad apicem obscure serrata; floribus in axillis solitariis, rarius didymis, bracteolis linearibus quam pedicellis duplo longioribus ornatis; calycibus 6–7 mm. longis, cano-puberulis, fauce intus nudis, dentibus subaequalibus, circa 1 mm. longis, lanceolatis, acutiusculis, labia postica longiore, ore itaque obliquo, pedicellis 1 mm. longis; corollis coccineis, 25–27 mm. longis, extus pubescentibus, tubo extra calycem multo dilato fauce intus sparse piloso, labro 3–3.5 mm. longo, emarginato, sinu .5 mm. profundo, labiolo aequilongo, lobis subaequalibus; staminibus supra tubi medium sitis, didymis, anticis corolla longioribus, posticis e tubo exsertis; thecis late divaricatis, .6 mm. longis; stylo e corolla 4–5 mm. exserto; nuculis non visis.

Specimens examined:

ECUADOR: Loja, between San Lucas and Oña, 2200–3100 m., Sept. 7, 1923, *Hitchcock 21527* (US); Loja, between La Toma and Loja, 1800–2600 m., Sept. 4, 1923, *Hitchcock 21437* (US); in montibus, Loja, *Hartweg 808* (cited by Bentham as *888*) (NY); vicinity of Loja, Sept. 29–Oct. 3, 1918, *Rose 23279* (US).

19. Satureia Andrei sp. nov.

Frutex habitu foliisque fere *S. glabratae*, foliis ramulisque tamen utrinque tomentellis, eis 10–12 mm. longis, oblanceolatis,

obtusis, in basi angustatis, venis prominulis, margine subserrata, subrevoluta, petiolis subnullis; floribus in axillis solitariis, bracteolis deciduis ornatis; calycibus 5.5 mm. longis, extus puberulis, 13-venis, dentibus 1 mm. longis, lanceolatis, acutis, subaequalibus sed tamen leniter bilabiatis, intus hirsutis; corollis extus villosis ut videtur circa 15 mm. longis, antheris generis vix exsertis, stylo exserto 4–5 mm.; nuculis non visis.

Specimens examined:

COLOMBIA: Cisne, Oct. 30, 1876, *Andre 4331* (NY, TYPE, haud satis est).

20. **Satureia striata** Briq. in Engler u. Prantl, Nat. Pflanzenfam., ed. 1, IV. Abt. 3a, 300. 1897.

Gardoquia striata Ruiz et Pavon, Syst. Veg. 148. 1798; Benth. Lab. Gen. et Sp. 404. 1834; et in DC. Prodr. **12:** 238. 1848.

Frutex strictus, altitudine .5–2 m., caule in basi crasso, duro, terete, striato, ramis ramulisque gracilibus, confertis, fastigiatis, subquadratis, pubescentibus; foliis densis, subconduplicatis, 2–5 mm. longis, plerumque ovatis, obtusis, in basi rotundato-angustatis, vix cordatis, glabris vel vena media subtus ciliata, pagine superiore nitida, venis impressis, inferiore punctata, venis pulchre elevato-striatis lateralibus circa 4–6, pedicellis subnullis, pubescentibus; floribus in axillis solitariis, bracteolis foliis conformalibus; calycibus 6–7 mm. longis, profunde sulcatis, 13-venis, glabris, fauce intus nudis, dentibus 1 mm. longis, subaequalibus, lanceolatis, acutis, patentibus, subrecurvis, pedicellis gracilibus 2 mm. longis; corollis rubris, 20–25 mm. longis, extus molliter villosis, tubo extra calycem multo ampliato, intus infra labiolum pilosis, labro erecto, 5–6 mm. longo, emarginato, sinu 1 mm. profundo, labiolo 4 mm. longo, lobis subaequalibus, rotundatis, medio patentibus; staminibus didymis, posticis e tubo paulo exsertis, anticis labrum subaequantibus, omnibus supra tubi medium sitis; thecis divergentibus, .5–.6 mm. longis; stylo e corolla 3 mm. exserto; nuculis non visis.

Specimens examined:

PERU: Mito, July 23–Aug. 14, 1922, *Macbride & Featherstone 1734* (FM; MBG); 12 mi. south of Panao, 3,076 m., July 4–10, 1922, *Macbride & Featherstone 2213* ("a common hillside shrub") (FM; MBG).

21. Satureia plicatula sp. nov.

Suffrutex procumbens, caule duro, ramisque teretibus, ramulis subquadratis, puberulis, nodis approximatis, saepe in ramulis lateralibus brevibus confertissimis; foliis 3–5 mm. longis, ovatis, apice acutis, subacuminato-mucronulatis, in basi rotundatis, subsessilibus, utrinque subglaucis et minutissime puberulis, venis paginae superioris leniter impressis, inferioris pulchre elevatis, lateralibus parallelis plicatulis, media prominentiore, margine serratula nec revoluta; floribus in axillis solitariis, bracteolis pedicellis aequilongis, lineari-carinatis, mox deciduis ornatis, calycibus 6 mm. longis, extus pubescentibus, fauce intus hirsutis, dentibus anticis 1.3 mm. longis, subulatis, patentibus, tribus posticis connatis, subulatis, subpatentibus, pedicellis 2–2.5 mm. longis; corollis coccineis 25 mm. longis, tubo extra calycem multo dilato, extus pubescente, intus praecipue ad staminum bases piloso, labro 4.5 mm. longo, emarginato, sinu .5 mm. profundo, labiolo paulo longiore, lobo medio lateralibus duplo longiore, rotundato, in hoc specimine emarginato, in basi angustato; staminibus paulo supra tubi medium sitis, didymis, omnibus e tubo exsertis, anticis corolla subaequilongis; thecis divergentibus, .7 mm. longis, stylo e corolla 5 mm. exsertis; nuculis non visis.

Specimens examined:

PERU: pendant from river cliff ledges, 2153 m., Llata, Aug. 21, 1922, *Macbride & Featherstone 2238A* (FM, TYPE).

22. Satureia Jamesoni Briq. in Engler u. Prantl, Die Nat. Pflanzenfam., ed. 1, IV. Abt. 3a, 300. 1897.

Gardoquia Jamesoni Benth. Lab. Gen. et. Sp. 404. 1834, et in DC. Prodr. **12**: 239. 1848.

Frutex ut videtur strictus ramosissimus altitudine .5–1 m., caule in basi crasso, duro, terete, striato, ramis ramulisque gracilibus, confertis, fastigiatis, subquadratis, pubescentibus; foliis parvis, confertis, 2 mm. longis, plerumque ovatis, obtusis, in basi rotundato-angustatis, utrinque tenuissime puberulis, subconduplicatis, margine revoluta integra, venis subtus prominentioribus, petiolis minimis, floribus solitariis vel tribus in axillis, bracteolis foliis conformalibus minutissimis; calycibus 5–7 mm. longis, profunde sulcatis, 13-venis, subglabris, fauce intus nudis, den-

tibus 1 mm. longis, subaequalibus, lanceolatis, acutis, patentibus, subrecurvis, pedicellis gracilibus 2 mm. longis; corollis rubris, 20–25 mm. longis, extus pubescentibus, tubo extra calycem multo ampliato, intus infra labiolum piloso, labro erecto, 3 mm. longo, emarginato, sinu 1 mm. profundo, labiolo breviore, lobis subaequalibus, rotundatis, medio patente; staminibus didymis, posticis vix e tubo exsertis, anticis labiolo paulo longioribus, omnibus supra tubi medium sitis, thecis divergentibus, .5–.6 mm. longis, stylo e corolla patenter exserto; nuculis non visis.

Specimens examined:

COLOMBIA: Ayapel, *Andre K 1564* (NY) (doubtful station).

ECUADOR: Provinces Azuay and Cañar, Paramo between Cuenca and Huigra, 2700–3000 m., Sept. 12–13, 1923, *Hitchcock 21693* (US); no data, *Lehmann 4676* (US); vicinity of Cañar, Sept. 15, 1918, *Rose 22720* (US).

23. Satureia connata nom. nov.

S. microphylla Briq. in Engler u. Prantl, Nat. Pflanzenfam., ed. 1, IV. Abt. 3a, 300. 1897; non Guss. Fl. Sic. Prodr. **2**: 120. 1828.

Gardoquia microphylla Kunth in Humboldt et Bonpland, Nov. Gen. et Sp. Pl. **2**: 311. 1817; Benth. Lab. Gen. et Sp. 404. 1834, et in DC. Prodr. **12**: 238. 1848.

? Satureia ericoides Willd. ex Benth. in Linnaea **11**: 328. 1837.

Frutex ut videtur altitudine circa 1 m., ramis ascendentibus, teretibus, cortice discedente, ramulis quadratis pubescentibus, nodis approximatis; foliis 2–3 mm. longis, subconduplicatis, ovatis, apice obtusis, in basi cordatis, subsessilibus, margine integra, subrevoluta, pagina superiore subglabra, nitida, inferiore puberula, venis prominentioribus; floribus in axillis solitariis, bracteolis omnino foliosis, pedicellos breviter superantibus; calycibus 5 mm. longis, extus puberulis fauce intus glabris, dentibus anticis ovatis, acutis, 1 mm. longis, erectis, tribus posticis connatis, subnullis, labia itaque subintegra, pedicellis 1–1.5 mm. longis; corollis coccineis, 15–20 mm. longis, tubo extra calycem multo dilato, extus pubescente, intus infra labiolum piloso, lobo 2.5 mm. longo, emarginato, sinu 1 mm. profundo, labiolo paulo breviore, lobis subaequalibus; staminibus in hoc specimine subaequilongis, paulo supra tubi medium sitis, 1.5 mm. longis, in

tubo omnino inclusis, thecis parallelis, .5 mm. longis; stylo e corolla 1–2 mm. exserto; nuculis non visis.

Specimens examined:

ECUADOR: ranch between Ibarra and Tulcán, Carchi, 3000 m., Aug. 10–11, 1923, *Hitchcock 20793* (near type locality) (US; NY).

E. *Revolutae*

Foliis 2–6 mm. longis, ovatis vel linearibus, pagina superiore glabra, sericea vel pubescentia, inferiore tomentosa vel puberula, margine patenter saepius valde revoluta, integra; floribus solitariis in axillis (5–9 in verticillastris sat densis in *S. rigidula*); corollis 9–25 mm. longis.

This group represents the extremes of adaptation to an arid habitat to be found in the genus. The conformation of the leaves of *S. Lindeniana* is especially noteworthy.

24. Satureia argentea Briq. in Engler u. Prantl, Die Nat. Pflanzenfam., ed. 1, IV. Abt. 3a, 300. 1897.

Gardoquia argentea Kunth in Humboldt et Bonpland, Nov. Gen. et Sp. Pl. **2**: 313. 1817; Benth. in DC. Prodr. **12**: 237. 1848.

Suffrutex procumbens, ramosus, ramis teretibus, cortice discedente, ramulis pubescentibus, quadratis, nodis approximatis; foliis 3–4 mm. longis, lanceolatis, acutiusculis, in basi rotundato-angustatis, sessilibus, margine patenter revoluta, integra, vena media subtus prominentiore, utrinque argenteo-canis; floribus in axillis solitariis, bracteolis omnino foliosis; calycibus 4.5–5 mm. longis, extus argenteo-canis, fauce intus nudis, dentibus anticis 1 mm. longis, ovatis, acutis, tribus posticis connatis, vix .5 mm. longis, acutis, pedicellis 2 mm. longis elatis, corollis coccineis, 14 mm. longis, tubo extra calycem valde dilato, extus villoso, intus infra labiolum piloso, labro erecto, 2.5 mm. longo, emarginato, sinu .5 mm. profundo, labiolo quam labro paulo breviore, lobis subaequalibus; staminibus didymis, posticis 2–3 mm. longis, vix e tubo exsertis, anticis 2–4 mm. longis, plerumque e corolla breviter exsertis, thecis paulo divergentibus, .6–.7 mm. longis; stylo e corolla 3–4 mm. exserto; nuculis non visis.

Specimens examined:

PERU: pendant from river cliff ledges, 2153 m., Llata, Aug. 21, 1922, *Macbride & Featherstone 2238* (MBG,).

25. Satureia Weberbaueri Mansfeld in Bot. Gart. Berlin-Dahlem, Notizbl. **9**: 285. 1925.

"Frutex 0.5 m. altus. Rami juniores quadrangulares, breviter puberuli. Foliorum lamina 6–11 mm. longa, 2–4 mm. lata, lamina majorum oblongo-elliptica v. lanceolato-elliptica, lamina minorum saepe linearis v. lanceolato-linearis, apice obtusiuscula, basi in petiolum angustata, margine revoluta (praecipue in foliis minoribus), supra et subtus, cano-brunneo-puberula, nervis supra immersis, subtus prominulis; petiolus 1 mm. longus vel subnullus, puberulus. Verticillastri apice ramulorum brevium spicas formantes, 2–6-flori; folia floralia conformia, calyces aequantia vel superantia; bracteae linares. Calyx 8 mm. longus, cano-brunneo-puberulus, costatus, bilabiatus (3/2), dentibus labii paullo connatis, dentibus labioli subliberis, intus puberulis. Corolla circ. 15 mm. longa, labio emarginato et labiolo trilobato circ. 3 mm. longis, extus ± pubescens, intus antice disperse pilosa. Stamina didynamia, filamenta antica 6 mm. longa, exserta, postica 4 mm. longa, subexserta; antherae divergentes. Stylus 20 mm. longus.

"Peru: Depart. Libertad, Prov. Santiago de Chuco, bei der Hacienda Angasmarca, lockeres, von Grassteppe durchsetztes Gesträuch, 3000–3100 m., ½ m. hoher Strauch mit purpurnen Blüten (Fl. 8. VII. 1914.—WEBERBAUER n. 7016!).

"Die nächststehenden Arten *S. argentea* (Kunth) Briq. und *S. sericea* (Presl) Briq. unterscheiden sich schon durch die dichtere, weisze Behaarung."

Mihi omnino ignota.

26. Satureia rigidula nom. nov.

S. fasciculata Briq. in Engler u. Prantl, Nat. Pflanzenfam., ed. 1, IV. Abt. 3a, 300. 1897, nec Rafin. Préc. Découv. 39. 1814; nec Tausch in Syll. Ratisb. **2**: 248. 1828.

Gardoquia fasciculata Benth. Pl. Hartweg. 243. 1839; et in DC. Prodr. **12**: 239. 1848.

Frutex altitudine 40–80 cm., ramis erectis vel ascendentibus, virgatis, ramulis numerosis, brevibus, ascendentibus, omnibus subteretibus, pubescentibus, saepe incanis, ramulorum internodiis foliis subaequilongis; foliis in axillis fasciculatis, sessilibus.

3–5 mm. longis, saepius oblongo-linearibus et in basi .5–1.5 mm. latis, frequenter tamen anguste triangulis et in basi latioribus, acutis, fere ad venam mediam revoluta, pagina superiore puberula, inferiore cano-tomentosa; verticillastris saepius 5–9-floribus, decussatim instructis, in spicam densam 1–4 cm. longam ad ramulorum apices confertis, bracteis subulatis, calycibus brevioribus; calycibus 3.5–4 mm. longis, extus puberulis, subbilabiatis, fauce intus nudis, dentibus lanceolato-subulatis, superioribus circa 1.5 mm. longis, inferioribus fere 2 mm. longis, pedicellis subnullis; corollis violaceis, circa 10 mm. longis, extus pubescentibus, tubo superne ampliato, decurvo, intus infra stamines pubescentibus, labro bifido, sinu circa .5 mm. profundo, labiolo trifido, lobo medio paulo majore, staminibus didymis, ad corollae medium sitis, anticis subexsertis, posticis inclusis, thecis divergentibus; stylo paulo exserto; nuculis oblongis, angustis, circa 1 mm. longis, fuscis.

Specimens examined:

?COLOMBIA: Rio Chota, June 6, 1876, *Andre 3583* (NY).

ECUADOR: plains of Pamasqui and San Antonio, 2615 m., *Jameson* (NY); in planitie Rumibamba necnon juxta pontem Guapalo prope Quito, *Hartweg 1338* (NY); no data, *Lehmann 6347* (US); Alausí, Chimborazo, 2500 m., July 19, 27, 1923, *Hitchcock 20719* (US); crescit in apricis prope Quito, 2461 m., Jan. 21, 1856, *Jameson 181* (GH); 1857–9, *Spruce 6062* (GH); Alausí, Chimborazo, 2500 m., July 19, 27, 1923, *Hitchcock 20705* (US).

27. Satureia sericea Briq. in Engler u. Prantl, Nat. Pflanzenfam., ed. 1, IV. Abt. 3a, 300. 1897.

Gardoquia sericea Presl in Benth. Lab. Gen. et Sp. 402. 1834; Benth. in DC. Prodr. **12**: 238. 1848.

Suffrutex procumbens vel erectus, altitudine circa 1 m., ramis ascendentibus, teretibus, cortice discedente, ramulis quadratis, sericeo-villosis, gracilibus; foliis 5–7 mm. longis, oblongo-linearibus, 1–2 mm. latis, obtusis, in basi ad petiolum brevissimum angustatis, margine integra, valde revoluta, utrinque sericeo-villosis, argenteis, subtus albis, saepe in axillis fasciculatis; floribus tribus in axillis, rarius solitariis, brevissime pedunculatis, bracteolis primis omnino foliosis, secondariis conformalibus sed

minoribus; calycibus 6–7 mm. longis, extus sericeo-villosis, dentibus intus supra faucem pubescentibus duobus anticis 1.5 mm. longis, posticis 1 mm., omnibus lanceolatis, acutis, pedicellis 1–2 mm. longis elatis; corollis coccineis extus villosis, 22–24 mm. longis, tubo extra calycem valde dilato, intus infra labiolum piloso, labro erecto, 3 mm. longo, emarginato, sinu 1 mm. profundo, labiolo paulo breviore, lobis subaequalibus, medio tamen paulo longiore; staminibus didymis, supra tubi medium sitis, anticis 7 mm. longis, e corolla exsertis, posticis 4 mm. longis, tubo subaequalibus, antheris .7–.8 mm. longis, thecis divergentibus; stylo 6–8 mm. e corolla exserto; nuculis non visis.

Specimens examined:

PERU: sunny slopes, "Chunmis," Chasqui, 3230 m., Sept. 27, 1922, *Macbride & Featherstone 1765* (MBG; FM); grassy rocky canyon slope, 2153 m., Llata, Aug. 21, 1922, *Macbride & Featherstone 2243* (MBG; FM); hacienda, 9 mi. up river from Yanahuanca, 3282 m., northwest grassy slope, June 21, 1922, *Macbride & Featherstone 1272* (MBG; FM); no data, *Matthews* (NY).

28. Satureia revoluta Briq. in Engler u. Prantl, Nat. Pflanzenfam., ed. 1, IV. Abt. 3a, 300. 1897.

Gardoquia revoluta Ruiz et Pavon, Syst. Veg. 149. 1798; Benth. Lab. Gen. et Sp., 405. 1834; et in DC. Prodr. **12**: 239. 1848.

S. insignis Mansfeld Bot. Gart. Berlin-Dahlem, Notizbl. **9**: 288. 1925.

Suffrutex procumbens, caulibus teretibus, cortice discedente, ramis ramulisque pubescentibus, subteretibus quadratisve, gracilibus, confertis et subfastigiatis; foliis densis, 2–3 mm. longis, ovatis vel patenter triangulis, apice obtusis, in basi truncatis, margine rarius convexa, valde et pulchre revoluta, pagina superiora viride, puberula, inferiore dense albo-tomentosa, petiolis 1 mm. longis elatis; floribus saepius solitariis in axillis, bracteolis omnino foliosis; calycibus 4.5–5 mm. longis, extus cano-puberulis, fauce intus nudis, patenter bilabiatis, labiis 1.5 mm. longis, dentibus parte dimidia breviore, lanceolatis, acutis, pedicellis maturis 3–4 mm. longis; corollis coccineis 20–22 mm. longis, tubo extra calycem multo dilato, extus molliter villoso intus infra labiolum pi-

losis, labro erecto 3 mm. longo, emarginato, sinu 1 mm. profundo, labiolo aequilongo vel paulo longiore, lobis subaequalibus; staminibus didymis supra tubi medium sitis, omnibus e tubo exsertis, anticis labro subaequilongis thecis subparallelis, .5 mm. longis; stylo e tubo 5–6 mm. exserto; nuculis non visis.

The present author has found no characters in the type collection of *S. insignis* as represented in the Field Museum to justify specific segregation from *S. revoluta* as understood by him.

Specimens examined:

PERU: *Wilkes Exp.* (US; GH); between Cuancabamba and Oyavaca, 3200 m., May 1912, *Weberbauer 6333*, (FM, *type collection* of *S. insignis* Mansf.); Oroya near Lima, 1919, *M. Kalenborn 162* (US; MBG); ? Culluy, July, *Matthews 666* (GH).

29. Satureia Lindeniana Briq. in Ann. Conserv. et Jard. Bot. Genève **2**: 191. 1898.

Suffrutex ut videtur, altitudine circa 15 cm., ramis e caudice lignoso erectis, virgatis, subteretibus, pubescentibus, nodis inter se 2–5 mm. distantibus, ramulis brevibus, erecto-ascendentibus; foliis circa 4 mm. longis, erectis, sessilibus, oblongo-linearibus, apice obtusis, in basi rotundato-angustatis, marginibus integris, valde replicatis et infra venam mediam conniventibus, paginam inferiorem cano-tomentosam itaque toto adumbrantibus, facie superiore pubescente, inferiore glabra; floribus oppositis, solitariis in axillis, calycibus subtubulosis, 6 mm. longis, extus puberulis, paulo arcuatis, patente bilabiatis, labia superiore 2 mm. longa, dentibus ad medium connatis, breviter triangulari-lanceolatis, inferiore 3 mm. longa, dentibus lanceolato-subulatis inter se liberis et a labia superiore sinu distinctiore separatis, pedicellis 1 mm. longis elatis; corollis 9 mm. longis, extus pubescentibus, tubo intus nudo, superne ampliato, leviter arcuato, labro suberecto, 1 mm. longo, ovato, emarginato, labiolo 2 mm. longo, patente, lobo medio majore obovato; staminibus sub labro ascendentibus; stylo paulo exserto; nuculis non visis.

Specimens examined:

COLOMBIA: Nevada Sta. Marta, *Purdie* (GH).

30. Satureia rugosa Briq. in Engler u. Prantl, Nat. Pflanzenfam., ed. 1, IV. Abt. 3a, 300. 1897.

Gardoquia rugosa Benth. Lab. Gen. et. Sp., 399. 1834; et in DC. Prodr. **12**: 236. 1848.

"fruticosa, villosa, foliis petiolatis ovato-rhomboideis serrato-dentatis basi rotundatis coriaceis rugosis utrinque villosis subtus vix canescentibus, verticillastris laxis, multifloris, calycis villosi dentibus subulatis ciliatis, fauce intus subnuda, corollis calyce vix duplo longioribus. In Peruvia (Ruiz et Pavon!). Frutex ramosissimus, ramis duris tetragonis junioribus rufo-villosis. Folia 1–1½ pollicaria, reticulato-venosa, floralia minora et cymas superantia. Cymae breviter pedunculatae. Bracteae oblongae, villosae, calyce breviores. Pedicelli breves. Calyces 3 lin. longi, tenues, virides, villosissimi. Corolla villosa, labio superiore erecto, brevissime emarginato, inferiore subpatente, lobis oblongis inter se subaequalibus obtusis integerrimis. Stamina didynama, antheris sub labio superiore per paria approximatis. Species aequo jure ad Melissam, Micromeriam, vel Gardoquiam referenda (v.s. olim in herb. Lamb.)." (Benth. in DC. Prodr. **12**: 236. 1848).

Sect. *Xenopoma* (Willd.) Briq. in Engler u. Prantl, Nat. Pflanzenfam., ed. 1, IV. Abt. 3a, 300. 1897.

Xenopoma Willd. in Ges. Naturforsch. Fr. Berlin Mag. **5**: 399. 1811.

Suffrutices fruticulive, rarius herbae perennes humiles, ramulis divaricatis, foliis obovatis, subintegris, pubescentibus; floribus 1–6 in foliorum axillis, praecipue in speciebus humilibus solitariis, pedicellis quam calycibus brevioribus, singulis bracteolis duobus ornatis elatis; calycibus tubulosis, frequenter subturbinatis, dentibus subaequalibus obscure bilabiatis acutis, intus nudis vel hirsutis, erectis vel patentibus; corollae tubo omnino incluso vel breviter exserto.

31. Satureia nubigena Briq. in Engler u. Prantl, Nat. Pflanzenfam., ed. 1, IV. Abt. 3a, 300. 1897.

Thymus nubigenus Kunth in Humboldt et Bonpland, Nov. Gen. et Sp. Pl. **2**: 316. 1817.

Micromeria nubigena Benth. Lab. Gen. et Sp. 381. 1834; et in DC. Prodr. **12**: 222. 1848.

Thymus humifusus Willd. ex Benth. in Linnaea **11**: 342. 1837.

Herba procumbens, fragrans, caulibus reptantibus, ramosissimis, ramis ramulisque filiformis, atris, puberulis hispidisve, subteretibus, foliis 3–4 mm. longis, approximatis, plerumque ovatis, apice obtusis, in basi ad petiolum angustatis, frequenter rotundato-ovatis et in basi sub-truncatis, utrinque puberulis saepius villosulis vel hispidulis rarius subglabris, margine integra revoluta; floribus in axillis solitariis, bracteolis parvis, linearibus, parte tertia pedicellorum longis ornatis; calycibus 3–4 mm. longis, superne patenter dilatis, hirsutulis, sub-15-venis, fauce subnudis, dentibus .6–.9 mm. longis, lanceolato-acuminatis, aequilongis, anticis tamen patenter majoribus quam posticis tribus, pedicellis 1.5–2 mm. longis elatis; corollis 5–6 mm. longis, tubo superne sat ampliato, nectarostegio e pilis intus fauce areolam formante, labro emarginato, sinu parte dimidia labri longitudinis profundo, labioli lobo medio majore, rotundato, 1–1.5 mm. longo; staminibus parvis, circa 1 mm. longis, didymis, supra tubi medium sitis, thecis paulo divergentibus; stylo corolla aequilongo; nuculis .8–.9 mm. longis, oblongis, atris.

Specimens examined:

VENEZUELA: "Poleo de paramo," Paramo Sto. Domingo, 3600 m., Mérida, Sept. 14, 1922, *Jahn 1151* (US); Laguna Verde, Paramo Mucuchies, Mérida, 3384 m., 1922, *de Bellard 19* (US); summit of Páramo, Quirorá, 3200 m., Mérida, Feb. 24, 1922, *Jahn 882* (US); Sierra de Nevada de Mérida, Laguna del Gallo, 4070 m., Dec. 1910, *Jahn 74* (US).

COLOMBIA: in monte ignivomo Azufral, May 18, 1876, *Andre 3249* (NY); Hacienda de Antisana, *Hartweg 1337* (NY); Ruiz, 3000 m., 1918, *Dawe 750* (NY); Canaan, Mt. Puracè, El Cauca, open near Rio Anambiu, 2900–3200 m., June 11–16, 1922, *Killip 6732* (ASP; US); dry open, 3500–4000 m., Paramo de Ruiz, Tolima, Dec. 16–17, 1917, *Pennell 3015* (US; MBG; GH; NY); Westabhange des Paramó de Ruiz, El Cauca, 3000–3500 m., Sept. 11, 1883, *Lehmann 3111* (US).

ECUADOR: Andes near Quito, 4000 m., *Couthouy* (NY); Andes of Quito, 4000 m., *Jameson 217*, "crescit in graminosis alpinis (vernacule "paramo de los Andes"), 4000 m., Jan. 21, 1856 (US; GH); Paramo de Tuza, 3400 m., Jan. 31, 1881, *Lehmann 3092 a* (US); between Urbina and Mt. Chimborazo, 3600–4500 m., Prov.

Chimborazo, Oct. 4, 1923, *Hitchcock 21987* (US; NY); La Rinconada between Ibarra and Tulcan, 3000 m., Carchi, Aug. 10–11, 1923, *Hitchcock 20787* (US; NY); paramo between Oña and Cuenca, 2700–3300 m., Azuay, Sept. 9–10, 1923, *Hitchcock 21635* (US).

PERU: mountain of ? Pellshum, "very plentiful," *Jameson* (ASP); on mossy rock, Tambo de Vaca, 4000 m., June 10–24, 1923, *Macbride 4399* (FM; MBG).

Var. **glabrescens** Benth in DC. Prodr. **12**: 222. 1848.

Ramis foliisque puberulis vel subglabris nec villosulis hispidulisve.

Specimens examined:

COLOMBIA: dry grassy paramo, 3700–4200 m., Paramo del Quindio, Caldas, Aug. 15–20, 1922, *Pennell & Hazen 10001* (US; ASP); grassy paramo, "Llano de Paletara," 2950–3100 m., June 15–17, 1922, *Pennell 6930* (ASP; US); no data, *Lehmann 4719* (US); Popayan, in paramo de Guanacas, *Hartweg 1336* (NY).

ECUADOR: Quitensian Andes, 1855, *Couthouy* (GH).

PERU: 6 mi. south of Mito, 3076 m., Aug. 1–5, 1922, *Macbride & Featherstone 1821* (NY; MBG).

32. Satureia Darwinii Briq. in Engler u. Prantl, Nat. Pflanzenfam., ed. 1, IV. Abt. 3a, 300. 1897.

Micromeria Darwinii Benth. in DC. Prodr. **12**: 222. 1848.

Fruticulus humilis, prostratus, tegetes faciens, caulibus in basi lignosis, ramis numerosis, subteretibus, pubescentibus, internodiis maximam partem minus quam foliorum longitudine; foliis 4–5 mm. longis, obovatis vel subspatulatis, obtusis, in basi angustatis, paginis ambobus pubescentibus; floribus in axillis solitariis, pedicellis circa 1 mm. longis, bracteolis duobus supra medium positis; calycibus vix 4 mm. longis, 15-venis, extus pubescentibus, dentibus 1 mm. longis, ovato-lanceolatis, obtusis, subaequalibus, incurvis, intus hirsutis, corollis 5 mm. longis, tubo incluso, labro bifido, labioli lobo medio majore; staminibus inclusis, vix 1 mm. longis, thecis sub-parallelis; nuculis von visis.

Specimens examined:

ARGENTINA: S. Patagonia in patches everywhere, Nov. 15, 1896, *Peterson* (NY); Patagonia, 50/30, 1882, *Moreno 186* (NY); Killikaike, Patagonia, *Brown 65* (NY).

33. Satureia pusilla Macl. in Rept. Princeton Univ. Exp. to Patagonia **8**: 698. 1905.

Micromeria pasilla (sic) Phil. Anal. Univ. Chile **90**: 556. 1895.

Herba perennis humilis, altitudine 5–6 cm., caulibus in basi duris, repentibus, ramis numerosis, gracilibus, puberulis, subteretibus; foliis 3–4 mm. longis, obovatis, in basi angustatis, utrinque puberulis, subsessilibus; floribus in axillis solitariis, pedicellis circa 2 mm. longis, bracteolis duobus ad medium positis; calycibus 3.5 mm. longis, extus hispidissimis, setis patentibus, 13-venis, bilabiatis, dentibus tribus posticis circa .4 mm. longis, anticis circa .6 mm., omnibus ovato-triangulis, acutis, saepe purpurascentibus, intus hirsutis, margine ciliolata; corollis vix 5 mm. longis, labro bifido, labiolo longiore, lobo medio majore; staminibus inclusis, vix 1 mm. longis, thecis parallelis; nuculis non visis.

Specimens examined:

ARGENTINA: Gregory Bay, Magellan Sts., Nov. 23, 1886, *Safford* (NY, *type collection*).

34. Satureia vana sp. nov.

Frutex foliosus altitudine 2 m., ramis teretibus, ramulis divaricatis, quadratis, puberulis, internodiis folia subaequantibus, foliis 8–12 mm. longis, late ovatis vel subrotundatis, obtusis, in basi saepius cuneatis, rugosis, margine supra medium subserratis, paginis ambobus puberulis, petiolis circa 1 mm. longis; floribus 3–6 in foliorum axillis, verticillastris subsessilibus, bracteolis 1 mm. longis ornatis; calycibus 3.5 mm. longis, in basi leniter angustatis, 13-venis, extus praecipue ad venas hispidulis, dentibus circa 1 mm. longis, ovatis, acutis, subaequalibus sed duobus anticis tamen longioribus, intus tenuiter hirsutis, pedicellis subnullis; corollis 7–8 mm. longis, extus villosulis, tubo superne gradatim dilato, labro 1.5 mm. longo, bifido, labiolo paulo longiore, lobo medio majore; staminibus didymis, breviter exsertis, thecis divaricatis; nuculis non visis.

A nondescript species singularly devoid of any marked character, but combining characteristics of sections *Gardoquia* and *Xenopoma*.

Specimens examined:

PERU: rainy-green formation, 3100 m., Carumas, Moquegua, Feb. 21–March 6, 1925, *Weberbauer 7259* (FM, TYPE).

35. **Satureia boliviana** Briq. in Engler u. Prantl, Nat. Pflanzenfam., ed. 1, IV. Abt. 3a, 300. 1897.

Micromeria boliviana Benth. Lab. Gen. et Sp., 731. 1835; et in DC. Prodr. **12**: 222. 1848.

Xenopoma bolivianum Griseb. in Goett. Abh. **25**: 272. 1879.

Satureia Kuntzeana Briq. in Engler u. Prantl, Nat. Pflanzenfam., ed. 1, IV. Abt. 3a, 300. 1897.

Frutex ramosus altitudine 30–90 cm., caulibus teretibus glabris, cortice discedente, ramis ramulisque puberulis, gracilibus, quadratis, angulis acutis, submarginatis; foliis .5–1.5 cm. longis, magnitudine formaque diversis, eis in ramulis sterilibus diffusis, ovato-ellipticis, obtusis vel subacutis, in basi cuneato-angustatis, margine frequenter obscure serrata et revoluta, plerumque 1–1.5 cm. longis, eis in ramulis florentibus densis saepius oblongis, obtusis, in basi angustatis, margine integra et revoluta, plerumque .5–1 cm. longis, omnibus utrinque puberulis floribus solitariis in axillis, subsessilibus et in paniculis brevibus lateralibus dispositis (frequenter tamen in ramis substerilibus tribus in axillis pedunculo breve elatis);calycibus 3 mm. longis, tubulosis, dentibus lanceolatis-acutis, subaequalibus, corollis 8–9 mm. longis, pubescentibus, tubo superne patenter ampliato, intus ad medium breviter piloso, labro 1 mm. longo, emarginato, labiolo 2 mm. longo, lobis subaequalibus, rotundatis, medio paulo majore; staminibus didymis 2–2.5 mm. longis, supra tubi medium insertis, thecis paulo divergentibus; stylo corolla aequilongo; nuculis non visis.

Satureia Kuntzeana was based by Briquet on a collection by Kuntze at Tunari, 4000 m., Apr. 1892. It was referred by him to the Section *Gardoquia* to a position near *S. microphylla* (*S. connata* nom. nov.) and *S. Jamesoni* with the following note "Les corolles sont blanches au lieu d'être écarlates, c'est encore une exception qui fortifie notre conception des *Gardoquia* comme simple section du genre *Satureia*." A sheet at the U. S. Nat. Herb. bearing the above-cited collection-data and labelled in Kuntze's hand "*Satureja Kuntzeana* Briq.," is assuredly *S.*

boliviana. It corresponds in every way to Briquet's description of the type.

Specimens examined:

BOLIVIA: Cotani, 2450 m., Sept. 1911, *Buchtien 5878* (US); La Paz, 2653 m., Aug. 15, 1901, *Williams 1674* (US; NY); Larecaja, Sorata, 2650–3300 m., Feb. 1857–July, 1858, *Mandon 517* (GH; NY); an sonnigen Abhängen, 3600 m., La Paz, Sept. 3, 1906, *Buchtien 438* (US); Tiahuanaco, 3900 m., Nov. 1913, *Buchtien 438* (GH; NY); La Paz, sonnige Abhänge, 3700 m., Nov. 3, 1906, *Buchtien* (GH); vic. of La Paz, Aug. 15, 1914, *Rose 18894* (US; NY); no data, *Bang* (NY); viciniis Achacache, monticula Arichaca in petrosis, 4000 m. alpine, Jan. 1859, *Mandon 518* (apparently a dwarf from 15 to 20 cm. tall, otherwise about the same) (NY); Tunari, 4000 m., Apr. 5, 1892, *Kuntze* (*type collection* of *S. Kuntzeana* Briq.) (US); Sirupaya bei Yanacachi, 2100 m., Nov. 28, 1906, *Buchtien 315* (US); Unduavi, 3076 m., Oct. 1885, *Rusby 1500* (ASP; US; GH; NY).

Var. **tarijense** comb. nov.

Xenopoma bolivianum Griseb. var. *tarijense* Wedd. in Griseb. Symb. Fl. Argent. 272. 1879.

Foliis patenter serratis, crenarum culminibus acutis, inter se 1–2 mm. distantibus, pagina inferiore pallidiore; corollae tubo calyce duplo longiore.

Specimens examined:

ARGENTINA: Cuesta de Tesanca et del Inca, May 25, 1873, *Lorentz & Hieronymus 1037* (NY).

36. Satureia simulans sp. nov.

Frutex ramosus foliosusque altitudine circa 2 m., ramis teretibus vel subquadratis, cortice discedente, ramulis ascendentibus, pubescentibus, quadratis, angulis obtusis; foliis 1–2 cm. longis, lanceolatis, acutis, in basi rotundato-cuneatis, utrinque breviter pubescentibus, margine revoluta, subserrata, petiolis 1–2 mm. longis elatis, floribus 3–6 in axillis, pedunculis brevibus elatis, rarius in axillis superioribus solitariis, bracteolis circa 1 mm. longis ornatis; calycibus 3.5 mm. longis, extus hirsutis, fauce intus nudis, dentibus fere 1 mm. longis, lanceolatis, acutioribus, duobus anticis quam posticis tribus paulo longioribus et saepe patentibus,

pedicellis subnullis; corollis 6–8 mm. longis, tubo intus piloso, superne gradatim dilato, labiis 1.5–2 mm. longis, labro emarginato, sinu .5 mm. profundo, labioli lobis subaequalibus, rotundatis, medio ad basim angustato; staminibus didymis, supra tubi medium sitis, vix e tubo exsertis, thecis parallelis, .4 mm. longis; stylo e tubo paulo exserto; nuculis von visis.

Planta aspectu *S. boliviana* speciminibus substerilibus valde similis, floribus tamen differt.

Specimens examined:

Bolivia: Unduavi; Nord Yungas, 3300 m., Nov. 1910, *Buchtien 2954* (US); Unduavi, shrub 2 m., 3300 m., Nov. 1910, *Buchtien 2955* (US, type); Sorata, Apr. 19, 1920, *Holway 550* (US).

37. Satureia axillaris (Rusby), comb. nov.

Bystropogon axillare Rusby, Mem. Torr. Bot. Club **6**: 108. 1896.

B. uniflorus Busby in Briq. Bull. l'Herb. Boiss. **4**: 802. 1896.

Suffrutex diffusus, ramosus, altitudine ad 1 m., caulibus ramis ramulisque gracillimis, glabris, quadratis vel caulibus teretibus, angulis submarginatis; foliis 10–25 mm. longis, 1.5–3.5 mm. latis, lineari-lanceolatis, rarius oblongis, apice acutiusculis, in basi ad petiolum brevem vel subnullum angustatis, utrinque omnino, glabris, margine subrevoluta, obscurissime et sparse serrata; floribus in axillis solitariis, bracteolis parvis, subulatis, quam pedicellis brevioribus subtentis; calycibus 1.5–2 mm. longis, tubulosis, dentibus lanceolatis, acutis, patentibus, subaequalibus, fauce intus glabris; corollis calyces vix superantibus, 2.5 mm. longis, tubo superne ampliato, intus glabro, labro emarginato, labioli lobo medio patente, rotundato, 1 mm. longo, staminibus minutissimis ad tubi medium sitis; stylo corolla aequilongo; nuculis non visis.

Specimens examined:

Bolivia: Bolivian plateau, 1891, *Bang 1125* (*type* of *Bystropogon axillare* Rusby) (US; ASP; MBG; GH); Sierra de Santa Cruz, 1600 m., May, 1892, *Kuntze* (NY).

38. Satureia brevicalyx sp. nov.

Suffrutex erectus altitudine 50–60 cm., caule ut videtur virgato, puberulo, quadrato, angulis obtusis, internodiis 2–4 cm. longis,

ramulis numerosis brevibus, ascendentibus, gracilibus, puberulis; internodiis 3–10 mm. longis; foliis 3–5 mm. longis, ellipticis vel ovalibus apice saepius obtusis, in basi rotundato-angustatis, margine revoluta, subintegra, utrinque molliter hirtellis, petiolis circa 1 mm. longis elatis; floribus solitariis in axillis, numerosis, bracteis subulatis, quam pedicello brevioribus subtentis; calycibus 3 mm. longis, late tubulosis, subbilabiatis, fauce intus nudis, dentibus ovatis, obtusis, subaequilongis; corollis 5–6 mm. longis, extus pubescentibus, tubo leniter arcuato, superne ampliato, intus infra stamines hirtello, labro subrecto, ovato, emarginato, labiolo quam labro paulo longiore, lobo medio obovato, majore; staminibus 1 mm. longis, inclusis, thecis parallelis, supra tubi medium sitis; stylo paulo exserto; nuculis ovatis, fuscis, .5 mm. longis.

Specimens examined:

PERU: Panticalla Pass, 3600 m., July 16, 1915, *Cook & Gilbert 1877* (US); "Bolivian and Peruvian Andes" (GH); Cuzco, March, 1925, *Herrara 825* (US, TYPE).

39. Satureia oligantha Briq. in Engler u. Prantl, Nat. Pflanzenfam., ed. 1, IV. Abt. 3a, 380. 1897.

Micromeria Gilliesii Benth. Lab. Gen. et Sp. 381. 1834; et in DC. Prodr. **12**: 222. 1848.

Xenopoma eugenioides Griseb. in Goett. Abh. **19**: 237. 1874.

Micromeria eugenioides Hieronym. in Acad. Nac. Cordoba, Bol. **4**: 413. 1881.

?*Bystropogon minutus* Briq. in Bull. l'Herb. Boiss. 4: 803. 1896.

Satureia Gilliesii Briq. in Engler u. Prantl, Nat. Pflanzenfam., ed. 1, IV. Abt. 3a, 300. 1897 (sub Sect. *Xenopoma*).

S. eugenioides Loes. ex Robt. Fries in Nov. Acta Soc. Upsal. IV. **1**: 107. 1905.

Suffrutex ramosus altitudine circa .5 m., in basi lignosus, caule terete, cortice discedente, ramis ramulisque puberulis vel tenuiter pubescentibus, gracilibus, subtortis, quadratis, angulis acutis; foliis 3–8 mm. longis, approximatis, oblongis, obtusis, utrinque puberulis vel pubescentibus, glandulosis, margine subrevoluta; pedicellis .5–1 mm. longis, subsolitariis, tribus tamen frequenter

in axillis inferioribus pedunculo breve elatis, bracteolis subulatis, pedicellis aequilongis ornatis; calycibus parvis, 1.5–2 mm. longis, campanulatis, dentibus subaequalibus, acuminatis, patentibus et paulo recurvis, fauce intus subvillosis; corollis calyces vix superantibus, 2.5 mm. longis, tubo superne ampliato, intus glabro, labro emarginato, labioli lobo medio patente, rotundato, 1 mm. longo, staminibus minutissimis ad tubi medium sitis; stylo corolla aequilongo; nuculis oblongis, .7 mm. longis.

Specimens examined:

PERU: above Chivay, Coilloma, Arequipa, March, 1914, *Weberbauer 6891* (FM).

BOLIVIA: Oruro, Tapacari, 4000 m., March 17, 1892, *Kuntze* (*type collection* of *Bystropogon minutus*) Briq. (NY).

ARGENTINA: Sierra Farmatura, 1873, *Lorentz & Hieronymus* (NY); Cuesta de la Muschaca, Catamarca, Feb. 1876, *Schickendanz 254* (NY); Sierra de Tucuman, Jan. 10–17, 1878, *Lorentz & Hieronymus 722* (US); Capillitas, Catamarca, 1875, *collector unknown* (ASP); El Candado, Andalgalá, Oct. 2, 1916, *Jörgensen 1139* (MBG; UC).

SPECIES MIHI OMNINO IGNOTAE

Micromeria pulchella Wedd. Chlor. And. **2**: 151. 1857.

Gardoquia salviaefolia Colla Mem. Accad. Torin. **39**: 2. 1836.

Satureia bonariensis Briq. in Engler u. Prantl, Nat. Pflanzenfam., ed. 1, IV. Abt. 3a, 300. 1897.

Micromeria bonariensis Fisch. et Mey. Ind. Sem. Hort. Petrop. **10**: 56. 1845.

"hispidula, caulibus erectiusculis, foliis linearibus punctato-glandulosis integerrimis, verticillastris sexfloris, corollis inclusis. In Bonaria unde sem. misit Bonpl. Thymus Bonariensis Ten. Ind. Sem. Hort. Neap. 1839. Corolla in planta culta saepissime calyptraeformis, non expansa, ex Fisch. Mey. An revera didynama? An eadem ac Hedeoma multiflora?" (Benth. in DC. Prodr. **12**: 223. 1848.)

Index Specierum

New species, varieties, and combinations are printed in **bold face type**; synonyms, in *italics*; and previously published valid names in ordinary type.